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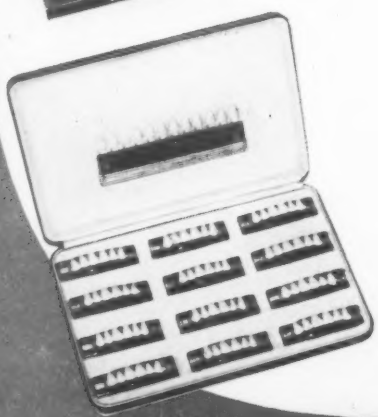

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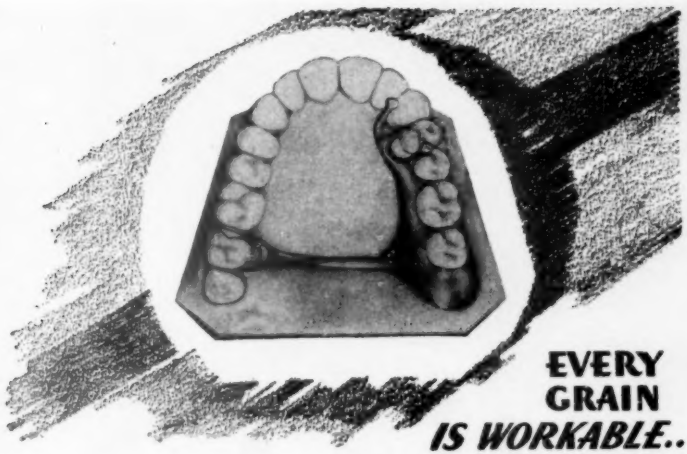

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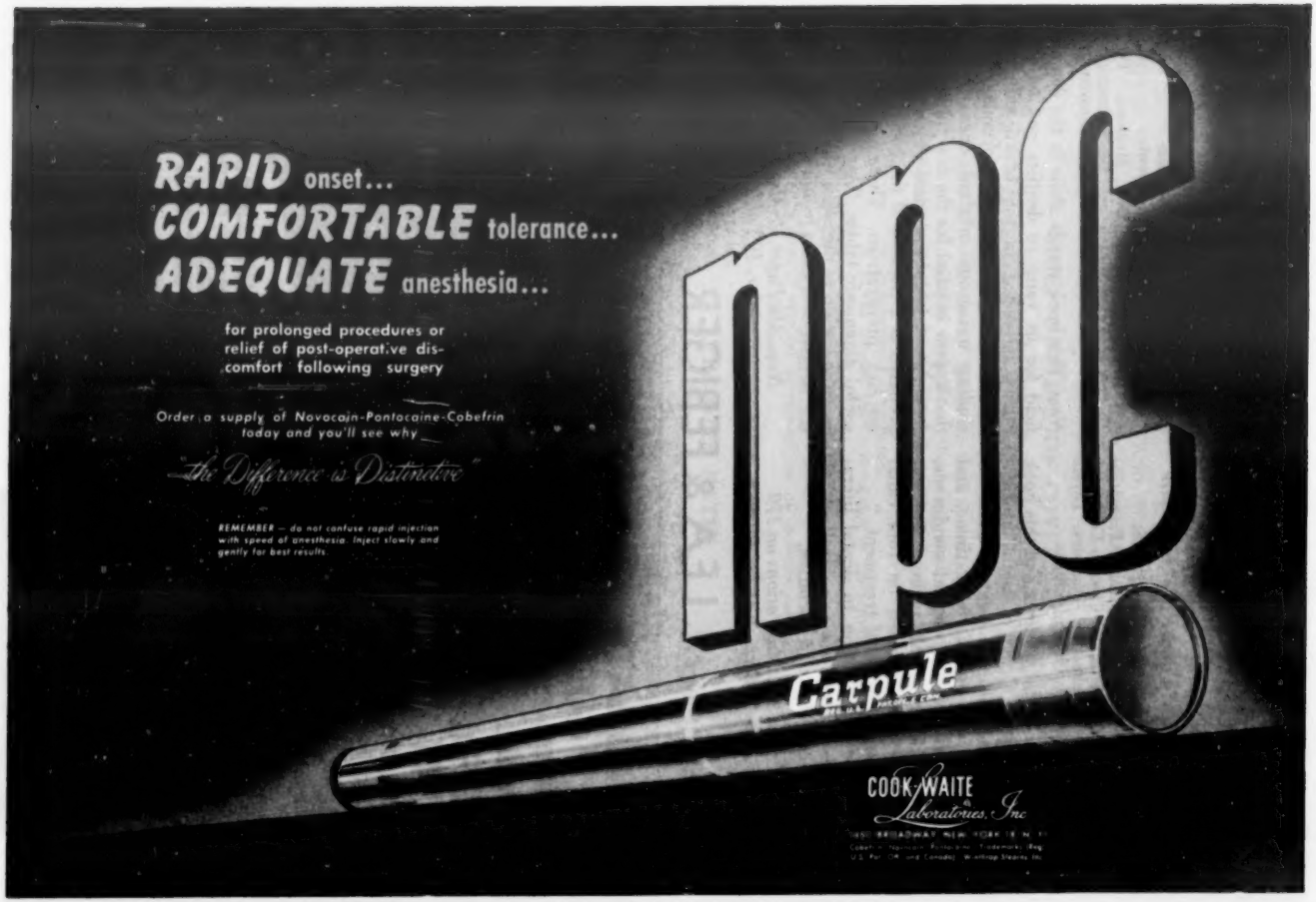
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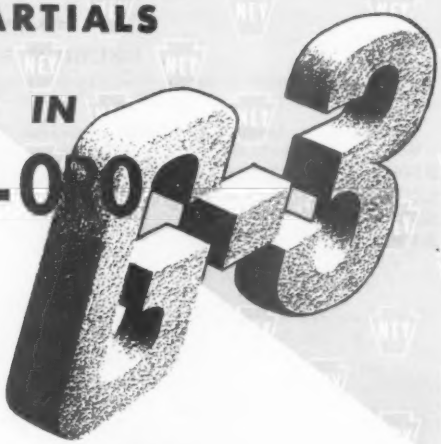

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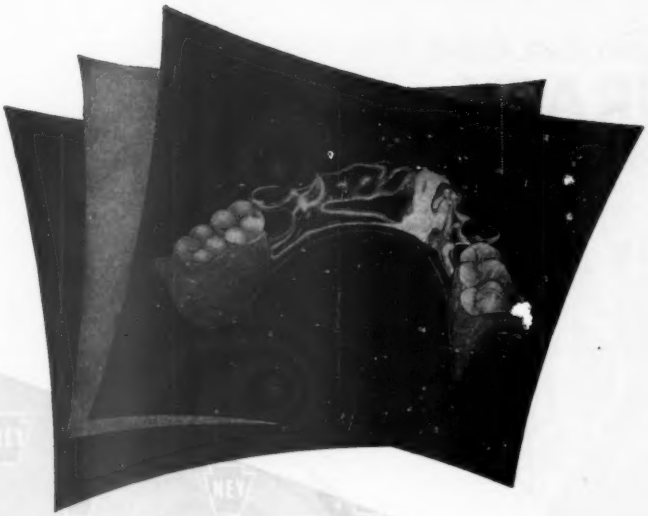

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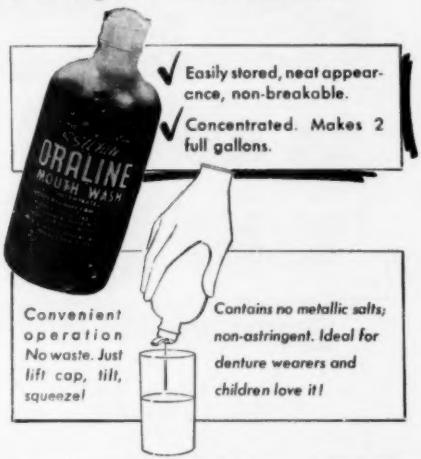
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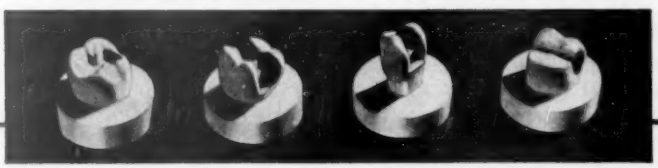

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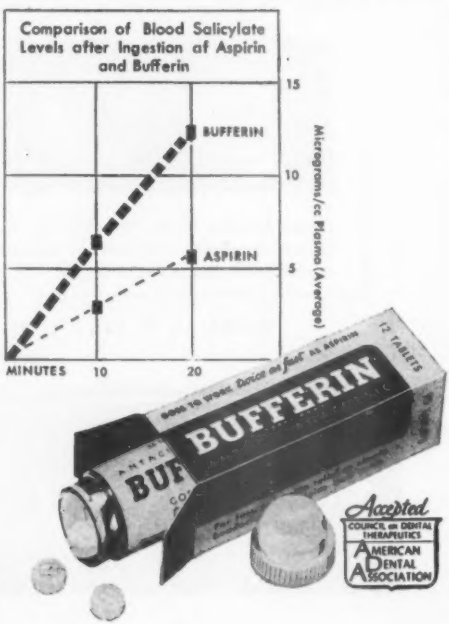

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THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Reattachment in periodontal therapy

Sigurd Ramfjord, L.D.S., M.S., Ph.D., Ann Arbor, Mich.

Reattachment means a new attachment of the soft tissue wall of a periodontal pocket to the corresponding root surface from which it had been detached previously by periodontal disease. This old and controversial subject will be discussed in relation to present knowledge on the clinical and histological aspects of the problem and with special reference to a recent investigation by the essayist.

The widely accepted postulate that an exposed pulp is a lost pulp has been proved to be wrong in several recent publications.[1] The potentiality of injured pulpal tissue for repair has been found to be much greater than assumed previously, provided that a proper diagnosis and correct treatment are utilized. Likewise, G. V. Black's commonly repeated statement, "Suppurative detachments of the periodontal membrane are permanent detachments,"[2] is another axiom which needs a thorough revision to conform with gradually increasing knowledge on the reparative ability of the periodontal tissues. Satisfactory treatment is as essential for the healing of periodontal tissues as it is for the healing of pulp and dentin.

An evaluation of the periodontal literature on this subject is difficult because of the existing confusion in the use of terms such as conservative treatment, subgingival curettage, oral prophylaxis and apoxesis. Subgingival curettage is used in this paper to designate a conservative technic for the elimination of periodontal pockets which remain after oral prophylaxis.[3] Conservative treatment is a broad term which embraces all phases of oral prophylaxis and which may also include subgingival curettage. Oral prophylaxis should precede all forms of

Presented before the Section on Periodontia, ninety-second annual session of the American Dental Association, Washington, D. C., October 16, 1951.

Associate professor of oral pathology and periodontia, School of Dentistry, University of Michigan.

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periodontal therapy, including gingivectomy, and cannot be used synonymously with subgingival curettage. The rationale for subgingival curettage is based on the possibility of periodontal reattachment.

PRESENT KNOWLEDGE OF PERIODONTAL REATTACHMENT

One group of investigators enthusiastically claims clinical evidence of reattachment in a large percentage of patients.[4-20] Another group claims that theoretically reattachment is impossible and that it never has been proved in practice.[21,22,23] A third small group thinks that theoretically reattachment is possible but that technical difficulties make it impractical.[24-27]

Younger[28] as early as 1893 outlined a basic concept of periodontal reattachment. First, he maintained, a thorough débridement of the teeth should be performed. This fundamentally important procedure should be followed by curettage of the exposed cemental surface and removal of the epithelial lining of the pocket. A blood clot established in the pocket and left undisturbed may organize into granulation tissue, differentiate later into cementoblasts and attach periodontal fibers.

That healing both in human beings and in animals may take place after surgical exposure of part of the root surface has been demonstrated histologically by several investigators.[5,29-32] Numerous well-known periodontists have reported clinical evidence of reattachment following treatment of periodontal pockets.[4,8,10,11,15,33,34] Roentgenographic evidence of new bone formation at the alveolar crest has been reported, but roentgenograms can be of significant value in the evaluation of a periodontal pocket only if a contrast medium has been introduced into the pocket and if periodical roentgenograms taken in identical positions are available for comparison. A fluid contrast medium gives more dependable results than gutta-percha points.[9,35] Roentgenograms alone, however, never add much to the clinical evaluation of the depth of the pocket.

Histological evidence of the nature of the reattachment between the tooth and the previously detached soft tissue wall of the pocket has been almost impossible to study because the patients are not willing to sacrifice teeth in which healing has occurred. A review of Box's well-known work[32] leaves one in doubt as to whether he demonstrated healing following surgical detachment by deep subgingival curettage or whether the healing actually

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occurred on a previously denuded root surface. This doubt remains because the depth of the pocket was not measured from a fixed point on the tooth. According to Kronfeld,[36] the only acceptable histological proof of reattachment is evidence of supporting structures attached coronally to a nick in the tooth made at the bottom of the original pocket.

A brief review of the essayist's investigations on reattachment[37] is included here to support the concept of reattachment offered in this paper. The experimental work was done on rhesus monkeys, utilizing a technic for subgingival curettage which clinically had proved to produce reattachment.[3, 8] The dentition, the periodontal structures, the oral bacterial flora and the masticatory function are essentially the same in rhesus monkeys as in human beings. The animals after living on a well-balanced diet suitable for human beings exhibited various degrees of gingivitis associated with materia alba, dental plaques and calculus. Deep pockets were created surgically, and metal caps which extended to the bottom of the pockets were cemented on the teeth. The caps were left on the teeth for one month to allow time for epithelization of the pockets.[34] During this time several other pockets gradually developed as the result of severe irritation and of inflammation which the caps caused in the periodontal tissues. It should be emphasized that the last-mentioned pockets were not surgically created but developed as the result of local irritation. All measurements of pocket depth were recorded from fixed points on the teeth. After the removal of the overhanging metals caps no diminution in the depth of the pockets occurred before subgingival curettage was performed. The treatment and observation period was three to four months; during that time clinical reattachments, ranging from 1 to 4 mm., were obtained in all but one pocket. The best result was obtained in one of the pockets which had developed gradually from the gingival irritation. The usual objection that experimental work on animals does not produce conditions comparable to those found in man is valid. In this investigation, however, the periodontal pathology and the environmental factors such as diet, bacterial flora and accretions were essentially the same as those found in man. The main objection to using monkeys was the impossibility of securing cooperation in the matter of oral hygiene. Consequently the clinical results were not as satisfactory as those usually obtained in human patients.

Periodontal reattachment coronally to identification marks on the root surface was found histologically (Fig. 1). In areas with slight or no evidence of periodontal inflammation a connective tissue reattachment and new formation of cementum and alveolar bone were observed. In other areas with more noticeable inflammatory infiltrations, an

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29. Borden, S. M. Histological study of healing following detachment of tissue as is commonly carried out in the vertical incision for the surgical removal of teeth. J. Canad. D.A. 14:510 (Oct.) 1948.

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31. Linghorne, W. J., and O'Connell, D. C. Studies in the regeneration and reattachment of supporting structures of the teeth. I. Soft tissue reattachment. J. D. Res. 29:419 (Aug.) 1950.

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33. Leonard, H. J. Periodontia procedure. Initial statement. J. Periodont. 16:141 (Oct.) 1945.

34. Smith, T. Sydney. The emetin hydrochlorid question in the treatment of periodontal diseases (pyorrhea alveolaris). J.A.M.A. 64:1567 (May 8) 1915.

35. Peters, J. F., and Greenstein, A. E. Use of a radiographic adjunctive aid in periodontal pocket diagnosis: a preliminary study. J. D. Med. 5:94 (Oct.) 1950.

36. Kronfeld, Rudolf. Histopathology of the teeth and their surrounding structures. Philadelphia, Lea & Febiger, 1939.

37. Ramfjord, Sigurd. Experimental periodontal reattachment in rhesus monkeys. J. Periodont. 22:67 (April) 1951.

epithelial reattachment was found on the root surface. This epithelial reattachment appeared the same as the normal epithelial attachment to cemental surface. Both epithelial and connective tissue reattachment occurred on old cemental surfaces as well as on dentinal surfaces. Evidence of surface resorption was found under the new-formed cementum deposited on previously exposed cemental and dentinal surfaces. The reattachment occurred on a tooth surface which had been exposed for several weeks to bacteria and decomposition products in the periodontal pocket. In addition, the soft tissue wall of the pocket previously had been epithelized and inflamed.

That the vitality of the cementum is not a decisive factor in reattachment has been known for a long time; new cementum has been observed on the surface of transplanted teeth which have been out of the mouth for long periods of time.[28] Cemental repair and reattachment of periodontal fibers in the apical region after a successful root canal therapy have been shown by several authors.[38, 39] The apical surface in a case of a chronic periapical abscess is as pus soaked and infected as any exposed root surface in a periodontal pocket, but few

Fig. 1 : Reattachment in rhesus monkey. Before treatment, intra-alveolar periodontal pocket extended to nick in tooth seen at bottom of picture. New formation of cementum, periodontal fibers and alveolar bone are evident. Bottom of new epithelial attachment is seen at top of photomicrograph. × 80

investigators deny the possibility of complete periapical healing in such an area. Evidence of resorption under the newformed cementum is often observed histologically on the portion of the root surface which was exposed in the abscess before the root canal therapy.

PROCEDURE FOR SUBGINGIVAL CURETTAGE

Mouth preparation preceding the subgingival curettage should include (1) scaling and polishing the exposed supragingival and subgingival surfaces of the teeth, (2) teaching the patient methods of good oral hygiene and supervising the advised hygienic procedures to ensure their effectiveness, (3) eliminating as many local irritants as possible, adjusting the occlusion, performing good restorative dentistry and immobilizing loose teeth.

When the periodontal inflammation following mouth preparation has subsided, the subgingival curettage should be done as follows:

1. The pocket is packed with rather thin cotton strings that have been saturated in a mixture of 75 per cent liquid phenol and 25 per cent camphor. Care is taken that the packs are pushed to the bottom of the pocket. After five minutes the packs are removed, alcohol (50 per cent) is applied and the pocket is flushed with warm water.

2. Sharp files or curets are used for curettage of the cemental surface. This curettage has to be extended slightly apically to the bottom of the pocket (Fig. 2). If curettage has been performed previously, areas of epithelial reattachment may necessitate a deeper curettage to ensure removal of the entire epithelial attachment. The surface of attached periodontal fibers is not a reliable clinical guide for a sharp curet.

3. The cauterized epithelium is scraped off with a sharp curet, and the epithelial attachment at the bottom of the pocket is removed. The region is rinsed out with warm water.

4. The area is dried with cotton rolls and hot air. A slight bleeding is produced in the wall of the pocket so that the sulcus is filled with blood. The area is kept isolated for about 10 minutes before it is exposed to saliva. Sometimes the blood clot can be protected by use of a suture pulling the gingival margin tight to the tooth. The use of varnishes is of questionable value.

5. The patient is advised to rinse his mouth frequently after 24 hours with a mild saline solution and to use a twist of cotton to clean the area carefully after meals. The patient is instructed also to return at intervals of two or three days for superficial careful cleaning of the area of the operation. Regular toothbrushing and massage are begun 10 to 12 days after the curettage.

Complete and dramatic closure of a deep periodontal pocket does not occur after treatment of this type. A clinical reattachment of 2 to 3 mm. after subgingival curettage should be considered a good result. If necessary, the same procedure can be repeated three to four weeks later. Sometimes only the apical part of a pocket can be closed by this treatment, but even a small gain of valuable support for the tooth justifies the subgingival curettage, regardless of the fact that the residual part of the pocket may have to be eliminated by gingivectomy.

EVALUATION OF TECHNICS AND RATIONALE FOR SUBGINGIVAL CURETTAGE

It has been shown experimentally[40, 41] and well explained from general knowl-

38. Hill, Thomas J. Regeneration of periodontal membrane after root curetment. D. Cosmos 73:799 (Aug.) 1931.

39. Nygaard-Oestby, B. Om vevsforandringer i det apikale paradentium hos mennesket ved rotbehandling. Oslo, Jacob Dybwad, 1944.

40. Swenson, H. M. Experimental periodontal pockets in dogs. J. D. Res. 26:273 (June) 1947.

edge on histology and physiology[27] that it is impossible for the epithelial lining of the pocket wall to attach itself to the root surface. Therefore, the epithelial lining of the pocket has to be removed to provide an opportunity for a new attachment. Numerous different technics have been recommended for this purpose.[8, 13, 14, 20, 34, 42-49] The epithelium should be removed as thoroughly as possible with a minimum of irritation to the underlying tissues and without decalcifying the surface of the root. Whether surgical curets or chemicals are used, it is important to be able to control exactly the extent of tissue destruction. Theoretically, the use of especially constructed curets appears feasible; but in practice it is difficult to ensure removal of the entire epithelial lining by the use of a curet without inflicting severe damage on the adjacent tissues. The removal of the epithelial attachment is extremely important; but small epithelial rests in the wall of a pocket do not necessarily prevent reattachment. The blood clot and later the granulation tissue will be situated between those epithelial rests and the root; with continued healing they will be surrounded by connective tissue similar to epithelial inclusions.[37] Concentrations of liquid phenol, varied according to the depth of penetration desired, have given good clinical results.[8, 42, 50] It is interesting to note also that Zander and Glass[1] applied 90 per cent phenol for two minutes on exposed pulps and found that this procedure produced a superficial necrosis but did not enhance or delay healing. The reason for the recommended curettage of the phenolized surface is that the residual necrotic epithelium may delay the organization of the blood clot.

Curettage of the cemental surface should be done as part of the subgingival curettage. A portion of the cemental cuticle remains attached to the surface of the cementum after the pocket formation, whereas the remainder of the cemental cuticle at the bottom of the pocket attaches the epithelium to the surface of the root by the epithelial attachment. New deposition of cementum cannot occur on the keratohyaline surface; therefore, the cuticle should be removed by curettage to the full depth of the epithelial attachment. Previous to exposure of the cementum in the periodontal pocket, the keratohyaline cemental cuticle plugs the small openings of the destroyed Sharpey's fibers. This phenomenon might explain why the bacteria and the toxic products in the periodontal pocket do not soak as deeply into the cementum as has often been stated and therefore why reattachment can be obtained without removal of a thick layer of cementum. Sharp files are practical instruments for the curettage of the cemental surface. If the dentin is exposed by excessive curettage of the cementum, the reattachment occurs as readily on the dentinal as on the cemental surface.[32, 37, 51] The assumption that smoothness of the cemental surface[11, 32, 52]

41. Skillen, William G., and Lundquist, G. R. An experimental study of peridental membrane reattachment in healthy and pathologic tissue. J.A.D.A. & D. Cosmos 24:175 (Feb.) 1937.

42. Barkann, Lillian. A conservative surgical technic for the eradication of a pyorrhea pocket. J.A.D.A. 26:61 (Jan.) 1939.

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46. Haley, Philip S. Packing the gingival crevice to eliminate the pyorrhea pocket. D. Cosmos 73:965 (Oct.) 1931.

47. Hecker, Friedrich. Pyorrhea alveolaris. St. Louis, C. V. Mosby Co., 1916.

48. Miller, S. C. Choice of treatment for periodontal pockets. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 31:34 (Jan.) 1945.

49. Stewart, Howard T. Partial removal of cementum and decalcification of tooth in the treatment of pyorrhea alveolaris. D. Cosmos 41:617 (July) 1899.

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Fig. 2 • Deep intra-alveolar periodontal pocket in human being. Untreated pocket usually has a shallow epithelial attachment, not exceeding ½ mm. as shown here

is important for the healing is biologically unfounded and has been shown to be unimportant.[37] Clinically it is easier to perform an efficient cemental curettage on a smooth surface than it is on a rough surface with undercuts which harbor debris and bacteria.

Box,[32] Beube[5] and others [51] have reported histological studies on the organization of the blood clot which should fill the periodontal pocket after the curettage. Their reports clarify only the initial phase of healing and not the intermediate stages of reattachment. Granulation tissue invades the blood clot along strands of fibrin; and when it contacts the highly calcified tooth surface, it tends to produce surface resorption. At the same time a differentiation into cementoblasts occurs along the surface of the root, and the new-formed cementum protects the root from further resorption. The new cementum, furthermore, provides attachment for forming periodontal fibers (Fig. 3). The same process occurs in repair following root fracture and has been described by several authors.[53,54] It has been maintained by some investigators[55] that instead of reattachment and formation of new cementum taking place, the connective tissue lines up along the surface of the

52. Merritt, Arthur H. Correlation of the symposium on different methods in the treatment of periodontoclasia. J.A.D.A. 18:1471 (Aug.) 1931.

53. Aisenberg, M. S. Adaptability of the periodontal membrane. J.D. Res. 26:421 (Dec.) 1947.

54. Kronfeld, Rudolf. A case of tooth fracture, with special emphasis on tissue repair and adaptation following traumatic injury. J.D. Res. 15:429 (Dec.) 1936.

55. Morris, M. L. Reattachment of periodontal tissue. Oral Surg., Oral Med. & Oral Path. 2:1194 (Sept.) 1949.

root and encapsulates the root as a foreign body. This unbiological assumption overlooks the fact that when a highly calcified structure such as the tooth root is in contact with connective tissue it undergoes resorption if it is not protected by epithelium or new-formed cementum.

The granulation tissue will not organize the blood clot to its most gingival extension. Fibrin, debris of dead cells and bacteria will constitute the top layer of the clot. The regenerating epithelium from the basal and spinocellular layer of the adjacent gingival mucosa will grow in as an extremely thin sheet covering the granulation tissue but passing under the surface debris.[56,57] When the regenerating epithelium reaches the junction between the granulation tissue and the tooth, it continues to grow down along the surface of the tooth, forming an epithelial attachment of the same nature as the initial attachment,[57, 58-60] and progresses until it is stopped by attached periodontal fibers.[61,62] Cementoblastic activity and connective tissue reattachment must occur before the epi-

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62. Rushton, M. A. Fibre-structure at the gingival attachment of deciduous teeth. Brit. D. J. 86:105 (March 4) 1949.

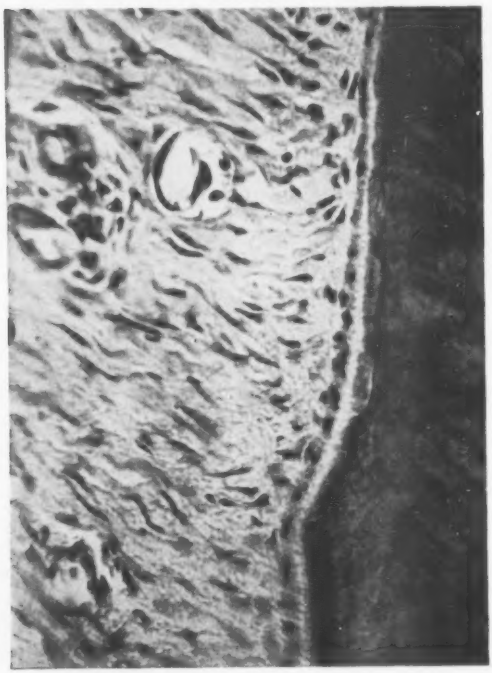

Fig. 3 • Periodontal reattachment in rhesus monkey. Evidence of cementoblastic activity and reattachment of periodontal fibers. × 700

thelial downgrowth has covered the surface of the root. The initial epithelial regeneration will probably be complete in five to 10 days, the time depending on the size of the clot and the depth of the pocket. If no connective tissue reattachment has occurred within that time, the regenerating epithelium will be stopped by the old periodontal fibers at the bottom of the previously removed epithelial attachment. Recognition of the factors which might delay or prevent connective tissue regeneration is therefore of the utmost practical value in order to avoid interference with the process of healing. Irritation and inflammation delay healing, and collagen does not form normally in the presence of pyogenic inflammation.[63] Clinical experience and histological evidence[30, 32, 37, 64] confirm the fact that connective tissue reattachment occurs only in areas with minor evidence of inflammation. Considering the fact that pocket formation is a sequela of periodontal inflammation, it would not be logical to expect healing of the same tissues in the presence of inflammation. The irritation and inflammation affecting the organizing blood clot may be either from the adjacent tissues or from secondary infection and irritation of the blood clot. If the soft tissue wall of the pocket is highly inflamed when the subgingival curettage is done, the presence of toxic products such as necrosin[65] and circulatory and metabolic disturbances in this area will impair and delay the process of healing and thereby provide time for the epithelium to grow down along the surface of the tooth before cementum and new fibers can be formed. Surgical removal of the subgingival granulation tissue has been highly recommended by most authors. If a proper oral prophylaxis has preceded the subgingival curettage, this previously inflamed granulation tissue has lost its inflammatory character and should not be removed; but if subgingival curettage is attempted in association with an initial scaling of a periodontal pocket, removal of the outer toxin-containing layer of the subepithelial granulation tissue probably would be justified. This is an unpredictable procedure which occasionally gives good results in pockets of the type shown in Figure 2, but in periodontal pockets with deep inflammatory changes it does not produce connective tissue reattachment. Furthermore, severe injury during the curettage of the pocket sets up an inflammatory reaction. The same local irritants that might cause periodontal disease also, if given a chance, disturb and delay the process of healing. It is therefore important to protect the area of healing from local irritation including traumatic occlusion. The use of antibiotics might be considered in order to decrease bacterial irritation. Penicillin should not be used locally because it delays clotting and there is a tendency for the blood clot to break down after the use of penicillin powder.[66] Parenteral use of penicillin or administration of aureomycin[67-69] is helpful in preventing bacteremia, but its effect in subgingival curettage is unknown. It is felt that the secondary bacterial infection is of minor importance compared with all the other local irritants which might disturb the course of the healing.

Several types of protective dressings have been recommended for the area of

63. Hass, G., and McDonald, F. Studies of collagen production of collagen in vitro under variable experimental conditions. Am. J. Path. 16:525 (Sept.) 1940.

64. Fish, E. Wilfred. Parodontal disease; a manual of treatment and atlas of pathology. London, Eyre & Spottiswoode, 1944.

65. Menkin, Valy. Newer concepts of inflammation. Springfield, Ill., Charles C Thomas, 1950.

66. Fleming, Alexander, and Fish, E. W. Influence of penicillin on coagulation of blood, with especial reference to certain dental operations. Brit. M. J. 2:242 (Aug.) 1947.

67. Cipes, L. R. Aureomycin. Report of clinical use in 90 cases of bacterial infection in the oral cavity. New York D. J. 16:450 (Oct.) 1950.

68. Selib, J. H., and Selib, M. S. Aureomycin gets dental trial. Case reports of initial treatment series. D. Survey 26:187 (Feb.) 1950.

69. Stewart, G. M., and Roth, L. H. Use of aureomycin in oral infections. A preliminary report. J.A.D.A. 40:563 (May) 1950.

operation. Varnishes should not be used because they have a tendency to float along the tooth surface and to separate the clotting blood from the tooth. The use of tin foil[9] or surgical dressings has been recommended. An important consideration is that the pocket should be adapted tightly to the surface of the tooth before the subgingival curettage is done so that a thin blood clot with a narrow gingival space is left after the operation.

The influence of systemic diseases or nutritional and hormonal disorders on periodontal reattachment is the same as the influence would be on the healing of a wound elsewhere in the body. If the patient has low tissue vitality and poor resistance to injury, he is naturally a poor risk for subgingival curettage.

Epithelial reattachment which is of dubious functional and prognostic value might be obtained after subgingival curettage even if the organization of the blood clot is considerably disturbed both by residual inflammation in the adjacent tissues[37] and by surface irritation. A new epithelial attachment in an area of gingival inflammation receives pathologic stimulation which causes proliferation and degeneration of the epithelium and reappearance of the pocket.

It is a statement often repeated among clinicians that the closure of periodontal pockets after subgingival curettage is only temporary because a future examination of the patient will reveal pockets of the same depth as before the treatment. That such a temporary clinical closure of a periodontal pocket in an area of inflammation is likely to be an epithelial attachment has not been wholly understood previously.

The regeneration of the alveolar bone after reattachment is stimulated by the new functional connection between the tooth and the bone. Alveolar bone is present only as a response to functional demand, and it undergoes resorption if the attachment apparatus is not reestablished. The deposition of new bone eventually restores normal width of the

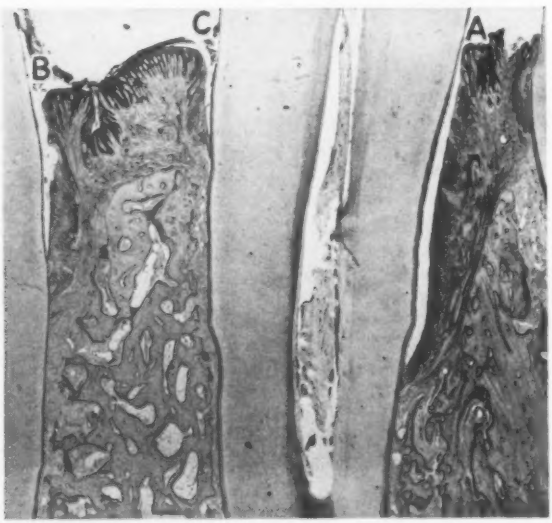

Fig. 4 • Deep, narrow intra-alveolar periodontal pocket at A offers better protection for a blood clot and better prognosis for reattachment than pocket at B with loose gingival margin. Soft tissue wall of periodontal pocket at C C has thin epithelial lining and firm connective tissue base providing good prognosis for subgingival curettage

periodontal space. It is not known whether by this treatment the level of the alveolar crest can be raised above the residual spicules of the alveolar bone.

INDICATIONS AND CONTRAINDICATIONS FOR SUBGINGIVAL CURETTAGE

Connective tissue reattachment, which is the goal for subgingival curettage, may be obtained if the following requirements are fulfilled:

1. All local irritants have been removed, the occlusion adjusted, the teeth stabilized and good oral hygiene established during the initial phase of the treatment.
2. Clinical signs of gingival inflammation are slight.
3. The pockets are accessible for an efficient epithelial and cemental curettage.
4. Conditions for a rapid organization of the blood clot in the pocket are optimal.

These requirements limit the practical use of subgingival curettage mainly to: (1) periodontal pockets in the anterior part of the mouth where accessibility is good both for home care and for treatment, (2) narrow deep periodontal pockets especially of the intra-alveolar type which offer good protection for the organizing blood clot (Fig. 4) and (3) pockets with a firm, rather thick, free gingival wall closely adapted to the surface of the tooth.

The contraindications include (1) a thin gingival wall or interdental papilla consisting mainly of epithelium (Fig. 5), (2) wide-open pockets where the blood clot cannot be protected and (3) pockets which are inaccessible for adequate scaling and home care. The third contraindication applies particularly to the molars, especially if the bifurcation or trifurcation area is exposed and the roots meet in a narrow angle.

Fig. 5• Periodontal pockets in human being. Thick epithelial lining and small amount of connective tissue constitute soft tissue walls of pockets. Clinically, this would be a loose and mobile interdental papilla offering poor protection for blood clots in the pockets. Subgingival curettage does not produce reattachment in pockets of this type

Biological demands of complete dentures

M. M. DeVan, D.D.S., Philadelphia

It is not enough for the dentist to look into the mouth of a patient and determine what type of denture will be adequate; he must take all factors into consideration. The successful wearing of complete dentures requires assets of three types: (1) structural, (2) psychologic and (3) biologic. A patient should possess sufficient oral structure to support dentures; namely, sufficient mass and distribution of alveolar and basal bone, satisfactory thickness and rigidity of mucoperiosteum, structurally sound temporomandibular joints and adequate muscle tissue, favorably attached. In addition, the patient must have the physical stamina and ability to make use of the tissue-supported dentures. The necessary psychologic factors are certain personality traits, especially the will to persevere in the initial and continued wearing of complete dentures and the emotional stability to ensure a satisfactory salivary reaction.

This paper deals with the third type of factors, the biologic. Of these the most important are (1) tissue tone, (2) muscle tone, (3) bone quality and (4) character and quantity of saliva. Age and general health of the patient are not listed as separate factors since they are associated with each of these four factors; an aged and sickly individual may not be able to meet the biological demands for complete dentures; his tissues, both the soft and the osseous, may lack the quality to meet the needs of mucosa-adherent artificial dentures.

TISSUE TONE

Tissue tone is an index to the nutritional and circulatory condition of the patient. The color and surface texture of the facial skin and oral mucosa should be observed. To the prosthodontist thin, anemic, blotchy facial skin usually means protracted and prolonged adjustments after the dentures are inserted. The thin, drawn face of early senescence may be indicative of insufficient adipose tissue in the oral mucosa to offer the cushioning effect required for the comfortable wearing of complete dentures.

Inflamed oral mucosa is usually supersensitive. Patients with tissues of this type experience difficulty in becoming accustomed to complete dentures both during rest periods and while chewing. When they speak, they feel a so-called tenderness in making the various tongue-teeth contacts required for the enunciation of the consonants. In addition, the supersensitiveness of these tissues causes patients with complete dentures to be slow in acquiring chewing facility. Com-

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Professor and chairman of the department of prosthetic dentistry, University of Pennsylvania School of Dentistry.

plete denture patients should be recalled yearly, primarily to observe mucosal tone. If the color of the mucosa covered by the denture is noticeably dissimilar to that of the mucosal covering of the tongue, lips and cheeks, an examination should be made to ascertain probable causative factors. Every phase of denture construction should be considered carefully; only those procedures should be followed which result in dentures that leave no inflammatory telltale signs of excessive or insufficient tissue pressure.

This is an extremely important point: dentures do not meet biological demands if the mucosa to which they adhere shows signs of inflammation. For this reason the use of a peripheral seal, including the customary post-damming, is to be avoided whenever possible. Mucosal tone is most nearly normal when oral tissue is registered in the impression in an undisturbed condition.

There is danger in excessive tight peripherally sealed dentures. They may cause atrophy of the soft tissues and resorption of the underlying bone.[1] The biological demands of complete dentures require that the wearing of the dentures should cause little or no change in tissue tone.

MUSCLE TONE

The proper preparation of food requires power, power furnished by the muscles of the face, mouth and jaws. Besides mastication, the musculature, supported by complete dentures, must maintain normal facial appearance and assist in the production of articulate speech. Although chewing capacity is important, in many instances it may be inadvisable to concentrate on that function at the expense of appearance and speech. By careful selection and preparation of food prior to ingestion an individual can cope successfully with the problem of reduced masticatory powers, but he alone can do little or nothing with his facial structure and his ability to speak well. The social status of many a man or woman is such that he or she may deem it necessary to require of the dentures the maximum in the way of appearance and speech, perhaps at the expense of masticatory efficiency.

Thus, the dentist must consider the contour of the labial flanges. It is customary to extend the labial flanges to the mucolabial fold in order to develop the maximum retention of the dentures and thereby to increase chewing efficiency. If this is done, the normal appearance of the superior portion of the upper lip including the base of the nose may be altered. On the lower denture such extensions usually destroy the esthetic dip associated with the juncture of the lower lip and the chin. A consideration of appearances is justly within the scope of a discussion of the biological demands of complete dentures. Labial flanges should be contoured primarily for appearance rather than for the retention of dentures. The tonicity of the enveloping muscles must be considered in developing flange height, thickness and contour. If muscle tone is high, the denture flange should be short to minimize displacing tendencies. The occlusal vertical dimension of the complete dentures should be less than the postural rest vertical dimension.[2] Patients should be told to keep their lower jaw relaxed. The following ditty repeated several times may help: "From this rule never depart: lips together, teeth apart." The relaxed position allows rest periods for the elevator group of muscles. The horizontal muscles such as the buccinators and the orbicularis oris need support from the dentures.

Kingery[3] has advanced a significant idea in his statement that the teeth con-

1. Weinmann, J. P., and Sicher, H. Bone and bones; fundamentals of bone biology. St. Louis, C. V. Mosby Co., 1947.

2. Sears, V. H. Principles and technics for complete denture construction. St. Louis, C. V. Mosby Co., 1949.

3. Kingery, R. H. Personal communication.

stitute only a third of the masticatory machine, that the other two thirds consists of the tongue and cheeks. These muscle organs serve as steering agents, guiding, directing and maintaining the food morsel between the teeth. The patient's kinesthetic sense and his neuromuscular skills play an important role in the successful use of complete dentures.

BONE QUALITY

In the act of mastication, the teeth, both the natural and the artificial, function as intermediaries, receiving the muscular force only to transmit it through the associated connective tissue to the underlying bone. Complete dentures require the continued preservation of the bony foundation on which they rest. A continual periodic rebasing and remaking of dentures is not satisfactory. Every possible effort should be made to build dentures within the physiologic and biologic limits of the available osseous structure. If alveolar bone is scant and its density is slight, an attempt should not be made to restore to position, proportion or form the structure that is missing. To do so would be to build beyond the structural foundation, contrary to the laws of statics.[4] Placing the posterior teeth outside the base area requires the maximum in the way of retention. Setting teeth within the ridge area helps to stabilize the denture and thus requires for function the minimum in the way of retention. It is extremely important to stabilize complete dentures. The usual objective of developing maximum retention only does not supply a much-needed preventive factor. The objective should be the constant preservation of what remains rather than the meticulous restoration of what is missing.

The terms retention and stability should be understood clearly. Stability is that state wherein forces that tend to cause motion are successfully resisted without loss of equilibrium. A stable denture is one that resists successfully the magnitude and direction of functional forces that tend to alter the positional relation of the denture to its osseous support. Actually, a so-called stable denture is only relatively stable, for absolute stability in any edentulous patient is impossible. In the above definition of a stable denture, it is important to note that the term osseous support and not mucosa is used; during function a denture may lose stability and yet maintain its positional relation to the mucosa. Under such circumstances the denture still possesses retention. Retention may be defined as that state of a denture wherein functional forces are unable to destroy the adhesion existing between the denture and the mucoperiosteum. It is apparent that a denture may be unstable and yet possess sufficient retention to resist dislodgment. As long as the denture under functional loads does not lose its grip upon the mucosa, it may be said to possess an adequate degree of retention but not stability. If a denture does not move noticeably in function, displacing the mucoperiosteum, it is said to be stabilized.

Stable dentures are the most effective means of preserving the denture foundation, which is composed of alveolar bone with its overlying mucoperiosteum and its underlying basal bone. Stable dentures are difficult, if not impossible, to construct when large amounts of alveolar bone have been lost, since the setup cannot be centralized sufficiently to satisfy the law of statics, that is, to exert force within the supporting structure and at a right angle to it. If bone quality is high, dentures that are retentive but not stable can be worn with minimum bone loss.

Patients who need complete dentures, however, usually possess bone of low density. Their metabolic processes have slowed down because of age or degener-

4. DeVan, M. M. Basic considerations in full denture planning. J. 2nd. Dist. D. Soc. (N.Y.) 25:451 (April) 1940.

ative disease processes. By roentgenographic study of the character of the trabeculae, the bone quality is identified as close-meshed or rarefied. Likewise the nature of the border of the bony ridge is characterized as smooth or jagged. The patient's health and age also are important factors in bone quality.

CHARACTER AND QUANTITY OF SALIVA

Patients with dry mouths are usually difficult patients. When saliva is subnormal in quantity, it is usually abnormal in viscosity. Ropy, sticky saliva is an unfavorable factor in the task of stabilizing the complete denture. When salivary viscosity is high, the moisture film between the mucosa and the denture base is increased in thickness. The effect of this film is to cause a greater separation between the denture base and the underlying bone. The tendency to skid and to displace the denture is thereby increased.

PRACTICAL SUGGESTIONS

1. The oral surgeon should hesitate to render a patient completely edentulous until he has considered the physical, biologic and psychologic factors pertinent to the case. Better still, he should defer extractions until a prosthodontist has been given an opportunity to appraise the patient's ability to wear complete dentures satisfactorily at that particular time. In some instances, the retention of a few natural teeth to serve as abutments for provisional partial dentures may ease the transition from natural to artificial teeth. A slight delay in rendering the patient completely edentulous may have favorable physical, biological and psychological results.

2. The oral surgeon should find out from the patient whether or not impressions of the natural teeth were taken prior to their removal; he should explain the desirability of having immediate replacements constructed before the natural teeth are removed.

3. In the removal of teeth, the oral surgeon should retain as much bone as possible, especially the buccolabial cortical plates above and the lingual cortical plates below.

Search for Error • For the layman, the most important thing about science is this: that it isn't a search for truth but a search for error. The scientist lives in a world where truth is unattainable, but where it's always possible to find errors in the long-settled or the obvious. . . . So-called "scientific" books that are supposed to contain final answers are never scientific. Science is forever self-correcting and changing; what is put forth as gospel truth cannot be science. ***Rudolf Flesch, The Art of Clear Thinking.***

The effect of tobacco on epithelial tissues of mice

Seymour J. Kreshover, D.D.S., M.D., Ph.D., Richmond, Va.

Interest in tobacco as a tissue irritant has been manifest for many years. This attention has been due, in large part, to the possible role of tobacco as an etiologic factor in oral leukoplakia and carcinoma. Clinical studies of this relationship have not been conclusive owing principally to the difficulty of establishing adequate methods of control and valid interpretation of clinical data. Nevertheless, as Krantz and Carr[1] indicated, the evidence would appear clear that tobacco smoke is irritating to mucous membranes. Therefore, the question as to whether such repetitious irritating action causes neoplastic growth remains a vital one, the answer to which is not readily available. Despite an increased incidence of cancer and leukoplakia of the mouth reported among heavy smokers,[2,3,4] the great increase in the use of tobacco in recent years has not appeared to show a significant concomitant increase in oral cancer. Although it would seem that experimental study could eliminate many of the shortcomings of clinical surveys, attention has rarely been given to the mouth. Furthermore, there remains the uncertainty of attempting to make clinical application of observations on the laboratory animal.

PAST EXPERIMENTAL STUDIES

Probably the two most important elements of tobacco, from the standpoint of tissue irritation, are nicotine and tar. Certainly, other products of combustion such as pyridine bases, hydrocyanic acid, organic acids, ammonia and aldehydes also have irritating qualities, but the quantities of these substances are small and possibly, therefore, of less significance. Past experimental studies have utilized tobacco in various forms, including extracts of the unburned leaf, tar and whole smoke. Other factors such as animal species and the site, mode and number of applications also have been varied. In most instances, the procedure has been to apply tar to skin surfaces by painting. In general, the findings in these studies have been lacking in uniformity, ranging from no apparent effect to inflammation to occasional benign and malignant tumors.

Bogen and Loomis,[5] applying tar to the backs of 12 mice twice weekly over a

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Professor of oral pathology and director of dental research, Medical College of Virginia, School of Dentistry.

1. Krantz, J. C., and Carr, C. J. The pharmacologic principles of medical practice, ed. 2. Baltimore, Williams & Wilkins Co., 1951, p. 749.

2. McCarthy, F. P. Etiology, pathology and treatment of leukoplakia buccalis. Arch. Dermat. & Syph. 34:612 (Oct.) 1936.

3. Eichenlaub, F. J. Leukoplakia buccalis. Arch. Dermat. & Syph. 37:590 (April) 1938.

4. Bloodgood, J. Cancer of the tongue. J.A.M.A. 77:1381 (Oct. 29) 1921.

5. Bogen, E., and Loomis, R. N. Tobacco tar: an experimental investigation of its alleged carcinogenic action. Am. J. Cancer 16:1515 (Nov.) 1932.

period of more than four months, observed no pathologic changes. On the other hand, a series of mice treated with coal tar manifested progressive epilation, thickening and papillary growths which, after a period of several months, gave evidence of malignancy. From these findings the authors concluded that tobacco tar does not possess irritating and epithelial stimulating properties that lead to the production of neoplastic growths. In a similar study, Sugiura[6] reported only one instance of carcinoma in a large series of mice of various strains receiving tar applications to the skin for a period ranging up to 500 days. A control group treated with coal tar showed a 65 per cent incidence of squamous cell carcinoma. Both of the previously cited reports included negative results in rabbits treated with tobacco tar. A later study by Flory[7] in which the backs and ears of mice, rabbits and rats were treated with the destructive distillates of tobacco showed an extremely high percentage of papilloma formation in the rabbits. The mice developed benign tumors much less rapidly and the rats not at all. An additional series of 122 mice treated with denicotinized distillates showed occasional papillomas and, in one instance, a carcinoma.

In the reviewed literature, only Roffo[8] undertook to demonstrate the effect of tobacco on the oral tissues. Exposing the gingiva of rabbits to nicotine and tobacco extract, he observed no lesions. When tobacco was applied in the form of whole smoke, however, typical leukokeratotic lesions were produced. Ten rabbits treated in this manner developed white, smooth patches after 25 days. Ten others, previously injected with 1.0 cc. of 5 per cent cholesterol solution, developed leukoplakia after 50 days of smoke applications. A third group of 10 rabbits receiving injections of 0.5 cc. of cholesterol solution every other day showed milky white patches on the treated gingiva at the end of 17 days.

As indicated by a number of clinical studies, a variety of predisposing factors may be of significance in the pathogenesis of lesions otherwise attributed to the irritating effects of tobacco. This would suggest the role of tobacco as perhaps an exciting one acting on a tissue having

6. Sugiura, K. Observations on animals painted with tobacco tar. Am. J. Cancer 38:41 (Jan.) 1940.

7. Flory, C. M. The production of tumors by tobacco tars. Cancer Research 1:262 (April) 1941.

8. Roffo, A. Leucoplasie expérimentale produite par le tobac. Rev. Sudamér. de méd. et de chir. 1:321 (April) 1930.

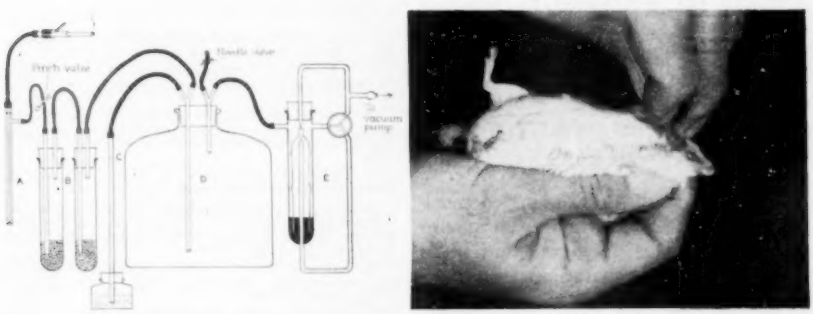

Fig. 1 • Left: Artificial smoking machine. Applicator A; smoke traps B; vacuum gauge C; reservoir D; manostat E. Needle valve and manostat adjusted for a flow of 17.5 cc. of smoke per second when pinch valve is open. Right: Showing application of smoke to lower lip. Contact of applicator tip to tissue is maintained with minimum pressure

an inherent tendency or predisposition to leukoplakia. The significance of predisposing factors and the suggestion that tobacco may be merely a nonspecific exciting factor are indicated by the occurrence of similar lesions in such varied regions as the vulva and urinary bladder.

That a deficiency in vitamin A can cause a metaplasia of epithelial tissues has been demonstrated in innumerable clinical and experimental studies.[9,10] It is, therefore, not surprising that clinical evidence points to the possible role of avitaminosis A in the etiology of leukoplakia. In a series of 43 cases of pruritus vulvae associated with leukoplakia, Swift[11] attributed the lesions to a deficiency of absorption of vitamin A caused by a varying degree of achlorhydria. Beneficial results were obtained when these patients were given both dilute hydrochloric acid and vitamin A in their diets. A previous study by Orr[12] of oral cancer in India not only demonstrated the relationship of this malignancy to betel nut chewing but also suggested that the prevalence of nutritional deficiency, especially of vitamin A, in the Travancore province might account for the greater incidence of cancer there than in other regions of the country.

Vitamin B also has been implicated as a predisposing factor in leukoplakia. Although the mechanism by which a deficient intake of this vitamin complex results in atrophy or keratinization of epithelial structures is not clear, Abels and co-workers[13] reported beneficial results following the administration of brewers' yeast to patients with oral leukoplakia.

The early studies of Ziskin[14] demonstrated the effect of estrogenic hormones on epithelial tissue. He found that when these hormone preparations were injected in large enough quantities into monkeys and women there resulted a gingival hyperplasia and hyperkeratinization. Later, using testosterone propionate, Ziskin found a similar tissue-stimulating effect.[15] In both instances a tendency to reduce existent inflammatory reactions in the corium was noted. Nathanson and Weisberger[16] reported significant improvement following administration of estrogenic hormones to a group of male and female patients with leukoplakia buccalis.

It is apparent from a review of the literature on the subject of tissue response to tobacco that little attention has been given to the effect of whole smoke on oral tissues or to the question of predisposing factors.

MATERIALS AND METHODS

A machine was devised (Fig. 1) by which applications of tobacco smoke could be made to the lips and ears of mice. Sites of application were the posterosuperior ear region and the mucocutaneous portion of the lower lip. This procedure was carried out on alternate days so that the animals received, on each day, a like number of applications of equal volume, similar exposure time and interval periods. Applying the applicator tip (A) to the selected site and opening the pinch valve, a stream of smoke was directed against the tissue for a two second period. The duration of

9. Eddy, W. H., and Dalldorf, G. The avitaminoses. ed. 3. Baltimore, Williams & Wilkins Co., 1944, p. 144.

10. Wolbach, S. B., and Bessey, O. A. Tissue changes in vitamin deficiencies. Physiol. Rev. 22:233 (July) 1942.

11. Swift, B. Achlorhydria as an aetiological factor in pruritus vulvae, associated with kraurosis or leucoplakia. J. Obst. & Gynaec. Brit. Emp. 43:1053 (Dec.) 1936.

12. Orr, I. M. Oral cancer in betel nut chewers in Travancore. Lancet 2:575 (Sept. 9) 1933.

13. Abels, J. C., and others. The relationship between dietary deficiency and the occurrence of papillary atrophy of the tongue and oral leukoplakia. Cancer Research 2:381 (June) 1942.

14. Ziskin, D. Effects of certain hormones on gingival and oral mucous membranes. J.A.D.A. & D. Cosmos 25:422 (March) 1938.

15. Ziskin, D. Effects of male sex hormone on gingival and oral mucous membranes. J.D. Res. 20:419 (Oct.) 1941.

16. Nathanson, I., and Weisberger, D. The treatment of leukoplakia buccalis and related lesions with estrogenic hormone. New England J. Med. 221:556 (Oct. 12) 1939.

exposure was maintained for an additional three seconds by closing the valve. Following this, the cigarette was removed from its holder and the valve again opened for two seconds in order to clear the circuit of smoke. A lag period of 23 seconds was then permitted before the smoking procedure was repeated. One cigarette sufficed for a series of 10 applications to the lower lip and five to the ear of each mouse. In all instances, the lip was treated first.

Seventy-eight mice between the ages of 10 and 12 weeks were treated in this manner. Of this number 20 were maintained on a normal adequate diet, eight were rendered deficient in vitamin A, 22 were maintained on a vitamin B complex deficient diet, 18 were gonadectomized and kept on a normal diet, and 10 were both castrated and vitamin B deficient. Comprising each experimental group were Swiss and C_{57} strain animals of both sexes.

Considerable difficulty was experienced in establishing an A avitaminosis which accounts for the small number of animals in the second group. Some degree of success was finally attained when the test diet was started at the time of weaning. A failure to gain weight and evidence of xerophthalmia were accepted as diagnostic criteria. In two instances a vitamin A assay was done on the livers after a period of 65 days maintenance on the special diet. Both showed a significantly low level. No mice in the small vitamin A deficient group survived for longer than 54 days and most of them died prior to the eighteenth day.

An additional four unsmoked control animals were observed in each experimental group. These were treated in the same manner as the experimental group except that an unlighted cigarette was used. In this manner, it was believed that the effects on the tissue of pressure and suction alone could be observed.

Daily observations were made of all animals and they were sacrificed at varying periods up to 76 days for histologic preparation of tissues.

FINDINGS

When examined grossly, the smoked ears of the animals on a normal diet showed little evidence of pathology beyond a slight degree of thickening and redness. Figures 2 and 3 show examples of this type of minimal change observed even after the maximum number of 38 smoke applications covering a period of 76 days. Since too few animals were followed in the vitamin A deficient group and half of these died before their tenth treatment with smoke, little may be said of the nature of their tissue response as evidenced by gross examination. The ears of these mice showed little change, however, beyond that observed in the group maintained on a normal diet. These findings were in striking contrast to those observed in the vitamin B deficient animals which showed, after only 20 days, unmistakable evidence of tissue change. Figures 4 and 5 show the ears of mice smoked for 34 and 50 days respectively. They were markedly thickened, scarred and, in many instances, excoriated. Such changes were, in general, typical of this vitamin B deficient group and, once manifest, showed little evidence of progression. The fourth group of animals which were gonadectomized and maintained on a normal adequate diet showed an almost complete absence of ear pathology regardless of the number of smoke applications. Figures 6 and 7 which show specimens from the ears of animals who received the maximum number of 38 treatments are illustrative of the apparent freedom from tissue change existent in this group. In light of the apparent difference in tissue response manifested by the vitamin B deficient group on the one hand and the castrated group on the other, it became of some interest to determine the manner of response in a series of animals rendered

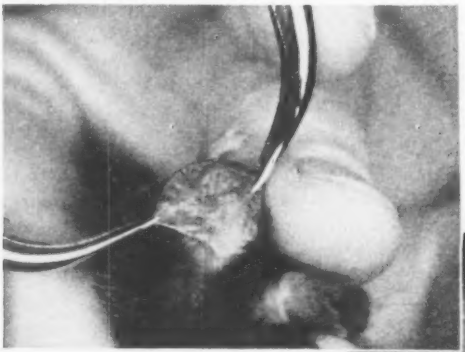

Fig. 2 and 3 • Ears of C_{57} and Swiss mice maintained on normal, adequate diet; 38 smoke applications. No abnormalities noted except for slight degree of thickening and redness

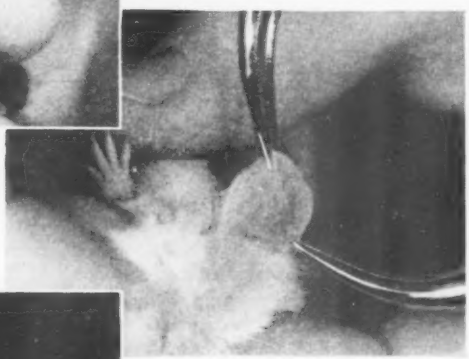

Fig. 4 • Ear of C_{57} mouse on vitamin B complex deficient diet; 17 smoke applications. Irregular thickening and excoriation of treated ear. White flecks are particles of test diet

Fig. 5 • Ear of vitamin B deficient Swiss mouse that had received 25 smoke applications. Pronounced thickening and irregularity of surface contour is seen

both vitamin B deficient and castrated. As seen in Figure 8, the characteristic picture was one of minimal change.

Gross examination of the lips showed no significant changes in any of the experimental animals regardless of group

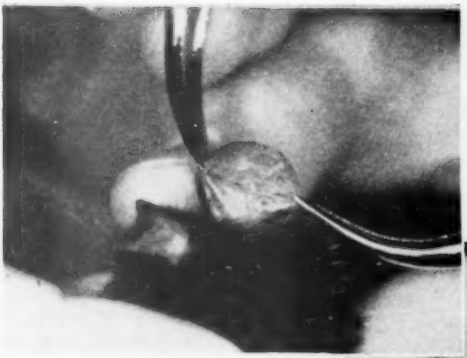

Fig. 6 and 7 • Ears of castrated C₅₇ male and Swiss female mice maintained on normal adequate diet; 38 smoke applications. No abnormalities noted. Applicator tip was applied to right of hole marker in the Swiss animal.

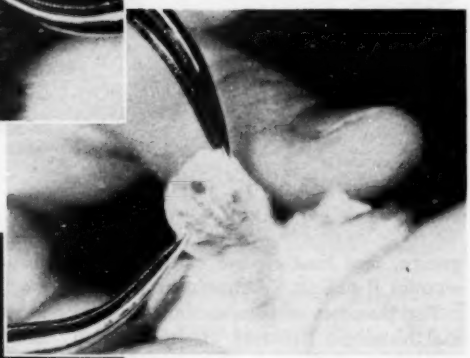

Fig. 8 • Ear of castrated Swiss male mouse; vitamin B complex deficient diet; 38 smoke applications; minimal change noted

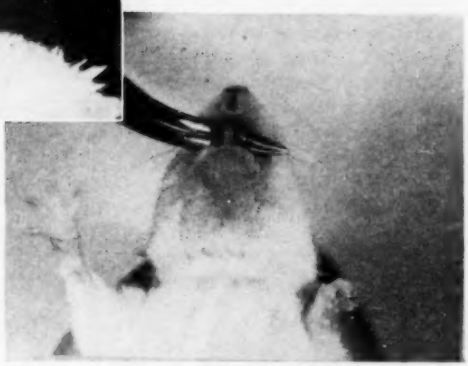

Fig. 9 • Showing relatively normal appearance of lower lip of animal maintained on adequate diet. This picture, after 38 smoke applications, is characteristic of all treated animals regardless of experimental group

(Fig. 9). Perhaps of some significance in this regard was the practice which was observed in the animals of removing deposited tars readily by means of tongue and saliva.

As in the case of the gross findings, histologic examination of the ears showed changes which were most noticeable in the vitamin B deficient group, less so in the vitamin A deficient and normal diet

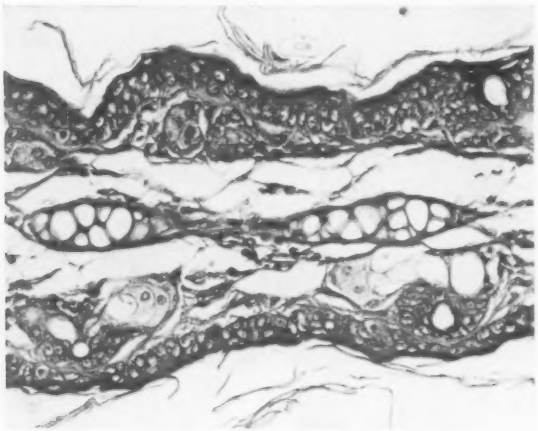

Fig. 10 • Untreated ear of control mouse showing thin epithelial surfaces, narrow corium and thin cartilaginous plate

groups, and least in the castrated and vitamin B deficient castrated animals.

For purposes of comparison, the normal histologic structure of the ear and lip is shown in Figures 10 and 11. Covering both surfaces of the ear is a thin layer of epidermis with occasional subjacent islands of sebaceous cells. The underlying corium is a loosely arranged tissue containing in its midregion a thin cartilaginous plate. This characteristic histologic structure was manifest in all the control animals regardless of their group. The photomicrograph of the lip is from the mucocutaneous region and shows the typical arrangement of epidermis, corium, hair follicles and sebaceous glands. In this instance also, there

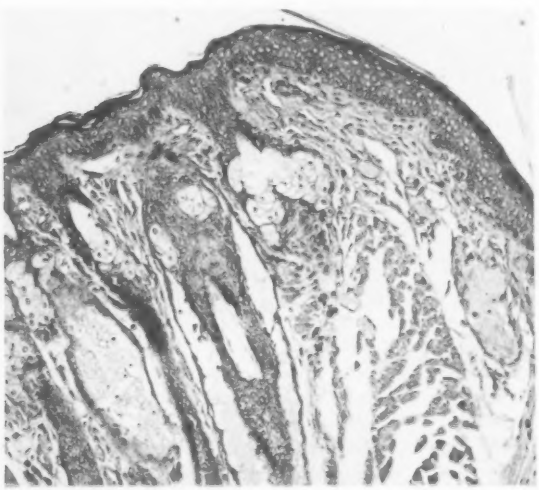

Fig. 11 • Mucocutaneous region of lower lip of untreated control animal. Normal architectural pattern of epidermis, corium and skin appendages is demonstrated

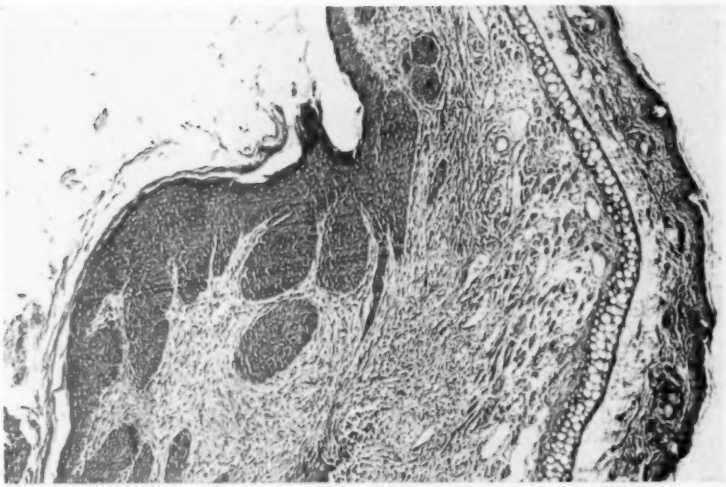

Fig. 12 • Ear of normal diet Swiss strain female mouse; 17 smoke applications. Treated side shows epithelial hyperplasia, minimal keratinization and corium thickened by chronic inflammation. Untreated side of ear, to the right, shows no abnormalities

was no apparent variation in structure in the different control groups studied.

In contrast to the normal architecture seen in Figure 10, the smoked ears of the mice maintained on a normal adequate diet showed appreciable epidermal hyperplasia and a variable degree of subcutaneous hyperemia, inflammation and fibrosis. Figure 12 is a specimen removed from an animal that had received 17 smoke applications. There is a minimal degree of keratinization overlying a markedly thickened epidermis with broad rete pegs. The corium is similarly thickened due, principally, to chronic inflammation. In contrast to these changes is the unsmoked surface as shown on the right, where epithelium and corium are as depicted in the control illustration. The changes seen in this case are, in general, typical of those present in most other mice from the same experimental group. Although the first evidence of tissue proliferation appeared after about 10 treatments, there was little progression of the lesion in the animals treated over a longer period.

Although the avitaminosis A group was small, several of the mice showed ear changes characterized by epithelial hyperplasia and keratinized nests in the basal cell region. These abnormalities were particularly manifest after 25 to 30 smoke applications (Fig. 13). Also seen in this photomicrograph, in addition to the epidermal changes, are moderate hyperkeratinization and round cell infiltration of the corium.

In contrast to the moderate degree of proliferative and inflammatory change observed in the normal diet and vitamin A deficient groups of animals were the pronounced keratinization and epithelial hyperplasia in the vitamin B deficient mice. Figure 14 shows a specimen from an animal who had received the maximum number of smoke applications covering a period of 76 days. The ear is noticeably thickened with an irregular, thickly keratinized surface and a pro-

Fig. 13 • Ear of vitamin A depleted Swiss strain mouse; 27 smoke applications. There is hyperkeratosis, epithelial hyperplasia with many contained islands of keratinized cells and round cell infiltration of corium

liferated epidermal layer which invaginates the underlying corium with broad rete pegs. The untreated surface of the ear is of normal appearance. This proliferative response was manifest in practically all mice of the vitamin B deficient group beginning between the fifth and tenth smoke applications. Although there was some variety of change, including instances of dyskeratosis, acanthosis and hyperkeratosis, there was evidence of more advanced abnormal growth in only one animal (Fig. 15). This occurred in a mouse who received 16 treatments over

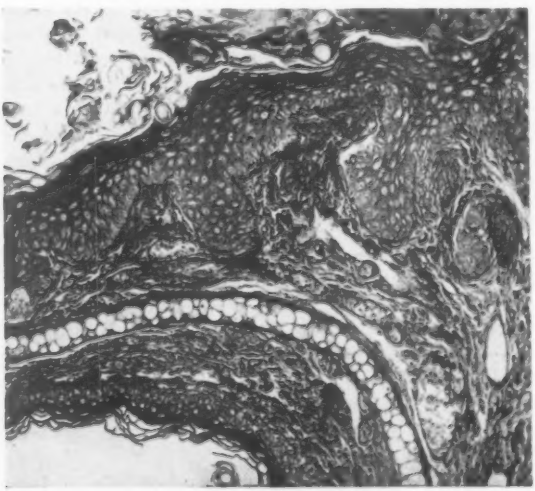

Fig. 14 • Ear of vitamin B complex deficient female mouse; 38 smoke applications. There is a pronounced degree of keratinization and acanthosis. Untreated side of ear is of normal appearance

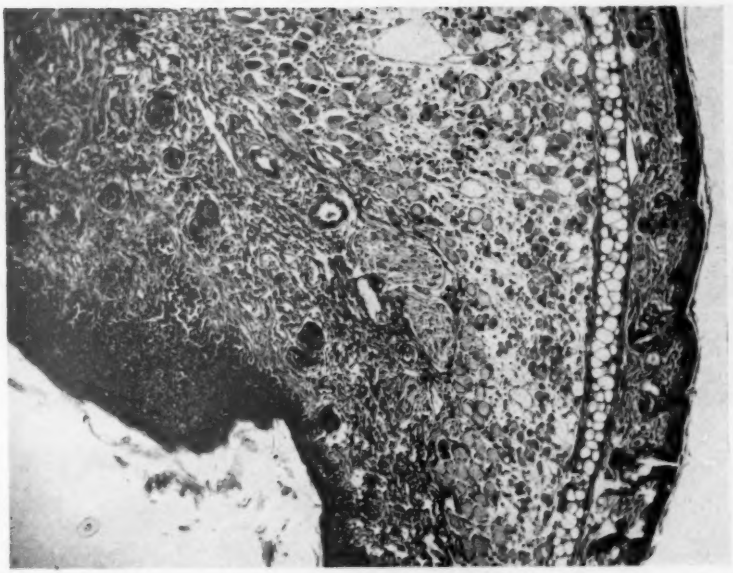

Fig. 15 • Ear of vitamin B deficient Swiss male mouse; 16 smoke applications. Treated side, to left, shows epithelial hyperplasia and interruption of basement membrane. Many nests of epithelial cells are seen in underlying corium. The latter structure is edematous and infiltrated with inflammatory cells

a period of 32 days. As can be seen in the photomicrograph, there is a hyperplasia of the epidermis at the site of treatment, as well as a pronounced thickening of the subcutaneous tissue which was due principally to edema. A higher magnification of the malpighian layer (Fig. 16) shows basal cell hyperactivity with some early loss of polarity. The cells also show appreciable variation in size, shape and staining qualities. A still higher magnification of one of the cell nests underlying the basal layer (Fig. 17) shows it to be comprised of cells of varying size and shape, with large and bizarre nuclei, prominent nucleoli and dense chromatin material.

In contrast to the changes observed in the three other experimental groups, the smoked ears of the castrated mice showed a minimal response, regardless of whether these animals were maintained on a normal or a vitamin B deficient diet. Figure 18, showing the ear of a castrated mouse that had been smoked for the maximum period of 76 days, illustrates the most advanced change. This change consists merely of slight epidermal thickening and a widening of the corium caused by edema.

With regard to the histologic appearance of the smoked lips, there was general conformity with the gross impression, that is, minimal or no change regardless of experimental group. In rare instances a parakeratosis was seen (Fig. 19).

It is of interest to note that in the entire series of mice studied there was no instance of any apparent relationship between tissue response and sex or strain of animal.

The series of mice subjected to suction

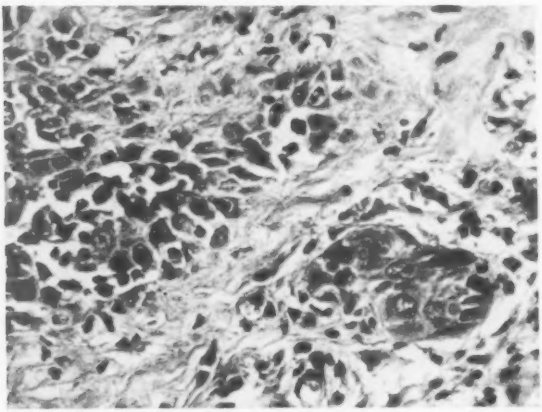

Fig. 16 • Higher magnification of Figure 15 showing basal cell hyperactivity and loss of polarity

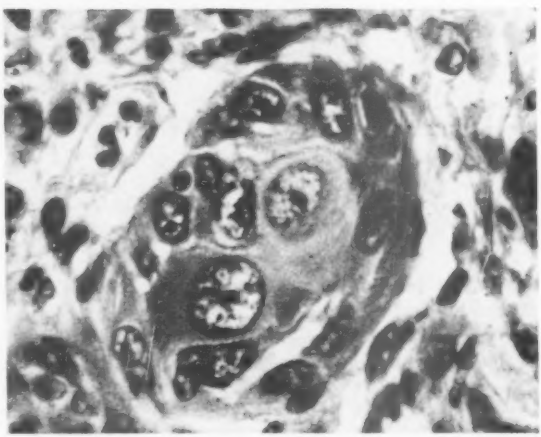

Fig. 17 • High magnification of one of the cell nests seen in Figure 15. The cells are of varying size and shape and contain large, bizarre nuclei, prominent nucleoli and dense chromatin material

and pressure alone, without a lighted cigarette, showed no gross or microscopic abnormalities of their lips or ears.

COMMENT

Ear changes similar to those described in this paper have been reported by others. These studies, however, have paid little or no attention to the question of predisposing factors. On the basis of findings in the present report, it is believed that vitamin deficiencies, especially of the vitamin B complex group, have an appreciable influence on tissue response to tobacco smoke irritation. Although the mechanism by which this influence is effected is not clear, previous investigations[17] have demonstrated a decreased utilization of oxygen by the skin of rats maintained on diets deficient in riboflavin. Such an altered oxidative ability of the

17. Adams, P. D. The oxygen uptake and composition of the skin of rats in vitamin G deficiency. J. Biol. Chem. 116:641 (Dec.) 1936.

epithelial tissues might well render them more susceptible to an extrinsic irritant such as tobacco. As noted in the photomicrographs, the ear changes were characterized chiefly by proliferative growth. In only one instance was this of sufficient abnormal character to suspect carcinoma. As in most previous reports of similar lesions caused by tobacco tar, however, not all the criteria of malignancy were met; that is, metastasis to a lymph node or other distant site, or a tumor that is transplantable. Certainly, an important question left unanswered in the present study is whether the invasive behavior of the tumors is dependent on the repeated application of the tobacco smoke rather than on an intrinsic capacity for unrestricted growth. This question is now being investigated.

With regard to gonadectomy, evidence is presented that this procedure renders the tissue less responsive to the tobacco irritant regardless of the sex of the animal. That this influence is partly of a protective nature is suggested by the

Fig. 18 • Ear of gonadectomized C₅₈ male mouse; 38 smoke applications. There is little change other than slight epithelial thickening and edema of underlying connective tissue

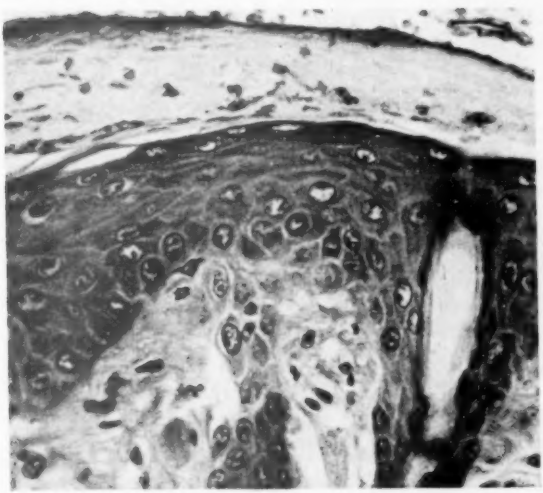

Fig. 19 • Lip of vitamin B complex deficient Swiss male animal showing a parakeratosis after 16 smoke applications

minimal ear changes observed in the castrated, vitamin B deficient mice. The mechanism of this effect is not clear and, undoubtedly, could be speculated on at great length.

As indicated in the introductory remarks of this report, the literature is almost completely lacking in experimental studies of the effect of tobacco on oral tissues. Of some significance in the present report is the failure of the lips to show changes corresponding to those observed in the ears of the various experimental animal groups. Although this may be accounted for, in part, by basic differences in the two tissues, it is probable that the action of the tongue and saliva which quickly removes deposited tars is a protective one. It is of interest to conjecture whether a similar mechanism of protection in the human being accounts for the pronounced variation in tissue response to tobacco smoke. On the basis of the animal findings, it is possible that such local factors might be of greater significance in tissue response than predisposing factors alone. Although the lip findings in this study are not in conformity with the observations of Roffo,[8] a comparison is not necessarily valid in light of the different oral tissues treated, the technic of applications and the species of animal used.

From the limited evidence given in this report, it is suggested that predisposing factors are of importance in tissue response to tobacco and that the irritant may be merely an extrinsic, exciting factor. The duration of exposure of the tissue to the locally deposited irritant, however, appears to be of some significance as evidenced by the failure of the lips to show any appreciable change.

SUMMARY AND CONCLUSIONS

An apparatus was devised so that applications of tobacco smoke could be made to the lips and ears of mice. The procedure was carried out on alternate days and standardized so that the animals received, on each day, a like number of applications of equal volume, exposure time and interval periods. Seventy-eight male and female mice of pure Swiss and C_{57} strains were treated in this manner. These animals were grouped so that one series was maintained on a normal, adequate diet, another was rendered deficient in vitamin A, and a third deficient in the vitamin B complex. Two additional groups were comprised of gonadectomized mice maintained on normal and vitamin B deficient diets. Gross and microscopic examination of the ears showed changes which were most noticeable in the vitamin B deficient animals, less so in the vitamin A test and normal diet animals, and least in the castrated mice regardless of their diet. Examination of the lips showed little or no change in any of the experimental groups. In no instance was there any relationship between tissue response and the sex or strain of animal.

Four control mice of each experimental group were given machine applications without the lighted cigarette in order to determine the effects of pressure and suction in the absence of smoke. No abnormalities were noted in any of these animals.

Experimental evidence is presented to substantiate the contention of many that predisposing factors are of importance in tissue response to tobacco and that the irritant may be merely an extrinsic exciting factor. The ear findings suggest that vitamin B deficiency increases susceptibility to the smoke irritant whereas gonadectomy establishes an appreciable degree of resistance. The occurrence of minimal or no lip lesions in all experimental groups might be attributed to the action of the tongue and saliva in removing deposited tars.

Jaw growth and tooth eruption in their relation to space maintenance

Thomas D. Speidel, D.D.S., M.S., Minneapolis

Generally, it is understood that space maintenance refers to a mesiodistal dimension within a dental arch. Thus, in the bicuspid area, it refers to a dimension that is mainly anteroposterior and in the incisor area to a dimension that is mainly mediolateral.

In common usage space maintenance is concerned principally with the problems of spaces and tooth shifting during the transition from the deciduous to the permanent dentition. In this paper the unmodified term space maintenance is used to refer to the problems of dental arch length from first molar to first molar. Dental arch length is the mesiodistal arch dimension measured, when the teeth are well aligned, along the line of the dental arch through the proximal contact areas or points and extending around the arch from the first permanent molar on one side of the dental arch to the first permanent molar on the other side of the arch.

The relation between arch length and tooth alignment is obvious. If the arch length from molar to molar is equal to the sum of the mesiodistal diameters of the bicuspid, cuspid and incisor teeth, these teeth can be well aligned and in contact with each other. If the arch length is less than the sum of the mesiodistal widths of the teeth, the teeth cannot be well aligned but probably will be rotated or crowded. If the arch length is greater than the tooth widths, there probably will be spaces between some or all of the teeth.

The dental arch length that is needed to accommodate properly a person's succedaneous teeth is determined by the mesiodistal dimensions of his teeth. The dental arch length that exists is determined primarily by the anteroposterior position of the first permanent molars, the anteroposterior position of the anterior teeth and the lateral locations of the cuspids, bicuspids and molars. Underlying these immediate determinants of arch length are all of the factors that bring these teeth into their positions. The positions that teeth achieve in the dental arches depend on (1) jaw growth, which alters the relative positions of teeth, (2) migration of the developing teeth within the jaws, (3) eruption of teeth from their intraosseous locations to their positions within the oral cavity and (4) the interaction of forces on the alveolar processes and teeth during and after their eruption. Because these relationships exist, it is evident that jaw growth and tooth eruption

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Professor of orthodontics, University of Minnesota, School of Dentistry.

are involved in any consideration of the development and maintenance of dental arch length.

COMMONLY ACCEPTED PRINCIPLES

Although much progress toward understanding jaw growth and tooth eruption has been made in recent years, much remains to be learned about the variations in these phenomena in individual children. Hence the relationships of jaw growth and tooth eruption to the problem of space maintenance cannot be defined with absolute certainty. Nevertheless, a number of concepts have emerged gradually from the many essays and research reports on these topics. The following eight concepts have come to be widely accepted as axioms or guiding principles:

Principle 1 • The gaining of arch length to accommodate the deciduous dentition is rarely a problem. This statement is fairly reliable. The jaws shortly after birth may be large enough to accommodate the deciduous teeth. Ortiz and Brodie[1] published a tracing of a lateral head roentgenogram of a newborn infant, in which the relative dimensions of the jaws and deciduous teeth can be noted. Broadbent's[2] tracing from a one month old infant likewise demonstrates sufficient anteroposterior jaw dimensions for the deciduous teeth.

Nevertheless, instances of deficiencies in deciduous arch length can be found. For example, Baume's[3] study shows instances of crowded deciduous incisors. Arches in which the deciduous teeth have tight contacts may be considered deficient in length since there is no extra space between the deciduous teeth and therefore it is likely that the succedaneous teeth will not have enough space. For most children accommodation of the deciduous dentition is not a serious problem but exceptions do occur. Not all children have sufficient coordination of their jaw dimensions, their tooth dimensions and the forces of the surrounding musculature so that the deciduous dentition is properly aligned.

Principle 2 • Spaces between well-aligned deciduous teeth usually indicate that jaw growth has provided more than enough space for the deciduous teeth, that is, more than enough arch length from the distal surface of the second deciduous molar on one side to the distal surface of the second deciduous molar on the other side. This extra arch length is usually needed when the permanent teeth erupt.

Baume's[3] study of serial models of the deciduous dentition indicates that after the deciduous dental arch is complete the lateral and anteroposterior dimensions of these arches do not change prior to the eruption of the permanent incisors; but changes do occur during the transition to the permanent dentition. Cohen's[4] and Sillman's[5] serial studies very nearly agree, their data showing small changes in some children during this period.

Baume classifies arches into those with spacing and those without spacing. He states that all of the spaced deciduous arches and some of the unspaced arches that he studied produced properly aligned permanent anterior teeth. Lewis and Lehman,[6] however, state that spacing of the deciduous incisors appears to bear little relation to the alignment of

1. Ortiz, Manuel H., and Brodie, Allan G. On the growth of the human head from birth to three months of life. Anat. Rec. 103:311 (March) 1949.

2. Broadbent, B. H. Ontogenic development of occlusion. Angle Orthodont. 11:223 (Oct.) 1941.

3. Baume, L. J. Physiological tooth migration and its significance for the development of occlusion. J. D. Res. 29:123 (April); 29:331, 338 (June); 29:440 (Aug.) 1950.

4. Cohen, J. T. Growth and development of the dental arches in children. J.A.D.A. 27:1250 (Aug.) 1940.

5. Sillman, J. H. Serial study of good occlusion from birth to 12 years of age. Am. J. Orthodont. 37:481 (July) 1951.

6. Lewis, Samuel J., and Lehman, Ira A. A quantitative study of the relation between certain factors in the development of the dental arch and the occlusion of the teeth. Internat. J. Orthodont. 18:1015 (Oct.) 1932.

the permanent incisors. They suggest that crowding of permanent incisors is more common when the permanent incisors are relatively large and the intercuspid increase of the dental arch is small. Some children whose deciduous arches show no spacing prior to permanent incisor eruption eventually have well aligned arches and some do not. Some children with spaced deciduous arches later have rotated permanent incisors.

In view of this clinical evidence there is little doubt that early growth prior to the completion of the deciduous dentition may provide more arch length and hence space than is needed for the deciduous dentition, that spaces between deciduous teeth are a favorable sign because they indicate a greater likelihood of achieving well-aligned permanent teeth and that neither the presence nor the absence of spaces in the deciduous arch is of itself a reliable indication as to whether or not the permanent teeth will be well aligned.

Principle 3 • After the eruption of the deciduous dentition, jaw growth does not provide additional anteroposterior space in the bicuspid region. There appears to be no evidence to disprove this concept. Illustrations dating as far back as Hunter's[7] in 1771 and Fox's[8] in 1803 show no anteroposterior increase in the bicuspid region after eruption of the deciduous teeth. To be sure, there are reports which show loss of second deciduous molars and mesial tipping of permanent first molars, followed by apparent reopening of the space to permit bicuspid eruption. Careful study of the records accompanying such reports suggests that these may be instances in which the space reopened because of the tipping or shifting of teeth on either side of the space. There is no evidence that the space was reopened by anteroposterior growth of the jaws in the bicuspid region.

Principle 4 • Arch width in the cuspid region increases during childhood, and thereby the dental arch length is increased. A number of investigators have measured arch width from cuspid to cuspid on models of children. The general conclusion from an evaluation of their data to discover the central tendency is that intercuspid width increases a few millimeters, especially during the period of permanent incisor eruption. The few reports that present serial data for individuals, however, demonstrate considerable variation from child to child.

Speck's[9] study of lower arch development includes an interesting method of appraising cuspid to cuspid change. He drew circles to coincide with the contact areas of the deciduous and permanent lower six anterior teeth of each child in a group of 46. He then determined the difference between the radius of the circle for the deciduous dentition and the radius of the circle for the succeeding permanent dentition. His chart of the distribution of the radius changes shows that in two instances the radius decreased 1 mm., indicating a decrease in the intercuspid distance; in five children there was no change between the deciduous and the permanent dentition intercuspid widths; in all others the radii increased, ranging from 1 to 5 mm., with the majority increasing 1 or 2 mm.

Wood's[10] study of changes in width dimensions, made on standardized serial posteroanterior roentgenograms, shows for 28 children the changes in lateral dimensions between the permanent cuspids from age 3 to age 15. His data demonstrate individual variations both in actual amounts of change and in directions of change. Comparison of meas-

7. Hunter, John. The natural history of the human teeth. London, J. Johnson, 1771, Plate XVI.

8. Fox, Joseph. Natural history and diseases of the human teeth, ed. 2. London, E. Cox & Son, 1814, Plate X.

9. Speck, N. T. Longitudinal study of developmental changes in human lower dental arches. Angle Orthodont. 20:215 (Oct.) 1950.

10. Woods, G. A., Jr. Changes in width dimensions between certain teeth and facial points during human growth. Am. J. Orthodont. 36:676 (Sept.) 1950.

urements at age 12 with dimensions at ages 15 or 16 reveals that in some instances the intercuspid width increased, in others this dimension decreased and in others it remained constant. In some children the direction of the change was the same in both arches. In other children, however, one arch changed and the other did not; or an increase in one arch was accompanied by a decrease in the other.

The studies of intercuspid width reveal some of the variations and the ranges that are encountered in a group of children. These data provide no assurance that any one child will exhibit changes that correspond to the averages frequently quoted.

Principle 5 • The first molars move laterally very little after they have reached occlusion and therefore contribute negligibly to any increase in arch length.

Several studies reporting average changes support this idea. Naturally, any individual variations are masked by the averages. Woods' serial study of 28 children reports intermolar dimensions for each child as well as the averages. His method enabled him to measure the pre-eruption lingual movement of the lower molars and the pre-eruption buccal movement of the upper molars. When his tables of measurements are studied to determine the changes from the age of 8 to 15 or 16 years, it can be seen that after the first molars come into occlusion, the distances between them may increase, decrease or remain stationary.

From Woods' data it appears that although the distance between the upper molars decreases in a few instances, the greatest decrease being 2 mm., the distance between the upper molars is much more likely to increase about 1 or 2 mm., the greatest increase being 4.5 mm. The distribution of the intermolar distances for the lower arch shows one group with increases, a second slightly larger group with decreases and a small third group with no changes. In most instances the changes recorded for the lower arch are small; however, the extremes are notable, the largest decrease being 3.5 mm., the largest increase 5.5 mm. A comparison of the changes in the upper and the lower arches of individuals reveals a surprising number of combinations of changes. For example, of the 23 children whose upper molars moved buccally, in 11 instances the lower molars moved lingually.

This observation leads to the conclusion that in any study of intermolar distances, the possibility of concurrent anteroposterior movement of the molars must be considered. A lateral movement of the molars that tends to increase arch length may be offset by a mesial movement having both an anterior and a medial component.

Principle 6 • The second deciduous molars appear to serve as anteroposterior guides for erupting first permanent molars. A review of the pattern of relationships of the second deciduous molar and the first permanent molar during their growth and eruption strongly suggests this influence.

Sources of information, such as gross dissection of cadavers, histological studies of jaws and roentgenograms of living infants, make it evident that a forming first permanent molar begins its growth posterior to the calcifying crown of the second deciduous molar. Postnatal growth in height of the alveolar process coupled with eruption causes the deciduous dentition to leave the forming first permanent molars far behind insofar as their vertical relationships are concerned. By the time the deciduous dentition is complete, the jaws have increased anteroposteriorly to the extent that the crypts of the second permanent molars can be located in the ramus and tuberosity in the same relative positions occupied by the first molars at birth. Broadbent's diagrams covering ages 5 to 8 show eruption of first molars which brings

these permanent molars into proximal contact with the second deciduous molars. Apparently this proximal contact is maintained as long as the deciduous molars are in place.

Exceptions to this usual pattern do occur. Instances of loss of a second deciduous molar prior to first molar eruption followed by eruption of the first molar into a mesial malposition are on record. Dentists are so confident that an early loss of a second deciduous molar permits mesial migration of the permanent molar that it is considered good practice in such a situation to place an appliance with an extension to contact the mesial surface of the unerupted first molar.

Early resorption of the distal aspect of the second deciduous molar roots accompanied by mesial migration of the unerupted permanent molar[11] is another variation that is an exception to the usual pattern. Likewise, anomalous forms of the second deciduous molar roots when associated with failure of these roots to resorb can deflect the permanent molar distally. These occasional variations appear to reinforce the observation that the anteroposterior location of erupting first permanent molars is largely determined by the second deciduous molars. Hence, it seems prudent to guard the integrity of the deciduous molars and thereby to maintain mesial contact support for the permanent molars.

Principle 7 • First permanent molars move mesially during the transition to the permanent dentition. Numerous writers, beginning with Hunter in the late 1700's, have described the changes that they observed during the transition from the deciduous to the permanent dentition. They have noted the different mesiodistal dimensions of each deciduous tooth and its permanent successor, the sequence of shedding and eruption and the consequent possible shifting of the permanent teeth as they come into position. The many drawings representing these changes are consistent in their demonstrations that the deciduous molars occupy more space than is required by their successors, but they differ in their representations of what happens to the space. For example, Hunter's illustration dated 1771 shows the permanent cuspid shifting slightly distally and the first molar moving slightly mesially. Fox's illustration dated 1803 shows more distal movement of cuspid and no mesial movement of first molars. Some authors' diagrams do not indicate which teeth are shifting during the transition. Other diagrams, such as that of Korkhaus,[12] omit the distal shifting of the cuspid but show anterior movement of permanent incisors and permanent molars.

Studies of molar positions, based on measurements of models and reporting average or usual findings, show anterior movement of first molars.[13] Several of the studies on models relate the molars to the incisors or to the cuspids, landmarks of questionable stability. One study recently reported,[14] in which standardized head roentgenograms were used, related the molars to the body of the mandible and concluded that no forward positioning of the lower molar occurred. This study, however, covered only a relatively short period. In brief, there is a strong tendency today to believe that forward positioning of the first molars during the transition period is inevitable.[15]

Speck in his study on arch length agrees with the majority of observers, for he states that most of the children, all

11. Cheyne, V. D., and Wessels, K. E. Impaction of permanent first molar with resorption and space loss in region of deciduous second molar. J.A.D.A. 35:774 (Dec.) 1947.

12. Korkhaus, G. Handbuch der Zahnheilkunde. München, J. F. Bergmann, 1939, vol. 4, p. 121, 122.

13. Goldstein, Marcus S., and Stanton, Frederick L. Changes in dimensions and form of the dental arches with age. Internat. J. Orthodont. 21:357 (April) 1935.

14. Foster, H. R. Analysis of the developing dentition. J.A.D.A. 42:376 (April) 1951.

15. Nance, H. N. Limitations of orthodontic treatment. I. Mixed dentition diagnosis and treatment. Am. J. Orthodont. & Oral Surg. 33:177 (April) 1947.

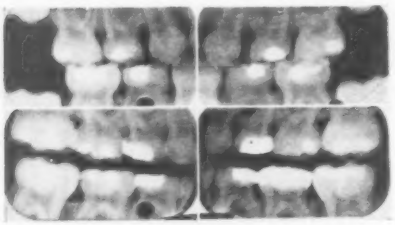


Fig. 1 • Upper: Roentgenograms showing spaces between deciduous cuspids and first molars of child 4½ years of age. Lower: Roentgenograms of same child 7½ years of age; spaces have closed

of whom developed good occlusion, showed a decrease in arch length from the deciduous to the permanent dentitions, that likewise in most instances the arch depth, the anteroposterior dimension measured in the midline from incisors to molars, decreased from the deciduous to the permanent dentition.

Especially noteworthy are several of his illustrations of changes in individuals. The most common changes were anterior movements of the first molars relative to the incisors; but there was one case in which there was practically no anterior movement of molars relative to the incisors. In this instance, however, if the molars had moved anteriorly, so, too, had the incisors. In another case there was a large anterior movement of the molars. Part of this change may have been the result of lingual movement of the incisors. Obviously, studies of models alone have their limitations.

Of limited value also are observations based on intraoral roentgenograms of localized areas. Frequently it is impossible to interpret such evidence with certainty. For example, in the upper roentgenograms of Figure 1, which were taken of a child aged 4½, prior to the first permanent molar eruption, spaces can be seen between the deciduous molars and the cuspids; the roentgenograms taken at 7½ years (Fig. 1, lower), when the first molars had erupted, show the spaces closed. It is tempting to conclude that the molars, both deciduous and permanent, shifted anteriorly during this period and closed the cuspid-bicuspid spaces. It is possible, however, that these spaces closed by distal shifting of the deciduous cuspids during the eruption of the larger permanent incisors.

Likewise, a single observation of a child must be interpreted cautiously. For example, in the upper roentgenograms of Figure 2, considerable space can be seen between the lower cuspids and the first bicuspids; the inference is that the first molars have not shifted mesially. A profile roentgenogram of the same child (Fig. 2) demonstrates good configuration of the facial skeleton. The fact that the axial inclinations of the upper and lower first permanent molars lie very nearly in the same plane suggests that there is little or no anterior resultant of the forces these molars exert on each other. These observations tend to reinforce the idea that the lower first molars did not shift anteriorly after the deciduous molars were shed. This interpretation, however, cannot be regarded as a certainty unless similar accurate records of earlier stages are available for comparison. It must be remembered that in the region of the cuspid and first bicuspid space may appear if the labial inclination of the anterior teeth increases.

Despite occasional instances in which the molars appear to be stable, deficiences in arch length are common. Doubtless many of these deficiencies are aggravated by mesial shifting of first molars. Therefore, it would seem prudent to do everything possible to keep first molars from shifting anteriorly at least until after the succedaneous teeth have erupted. When serial studies are available covering the entire period of transition to the permanent dentition and relating the first molars to nondental landmarks, more will be known about individual tendencies.

Principle 8 • Permanent incisors erupt with a greater labial inclination than that of their predecessors, and thereby arch length is increased. The drawings by Friel[16] support this idea. A comparison of Broadbent's tracings of a child's teeth at 2½ and 9 years of age suggests this change in incisor inclination, as do also the anatomical specimens of Atkinson.[17]

The diagrams of Goldstein and Stanton[13] show the permanent incisors farther anteriorly relative to the cuspids. Baume's study of serial models demonstrates instances of apparent forward extension of the anterior portion of the arches. However, he presents a tracing of one child's models in which there was no change in the upper incisors and a lingual movement of the lower incisors. Thus, serial studies of individuals permit variations to be seen.

Schaeffer's[18] serial study of incisor axes during growth demonstrates variations that may occur in individuals. When the axis of the upper incisor was related to the palatal plane, some persons showed no change in the angular relation, some showed change to a smaller labial inclination and some showed change to a

16. Friel, Sheldon, Occlusion. Observations on its development from infancy to old age. Internat. J. Orthodont. 13:322 (April) 1927.

17. Atkinson, S. R. Some anatomic factors guiding treatment therapy. Am. J. Orthodont. & Oral Surg. 28:704 (Nov.) 1942.

18. Schaeffer, Aaron. Behavior of the axis of human incisor teeth during growth. Angle Orthodont. 19:254 (Oct.) 1949.

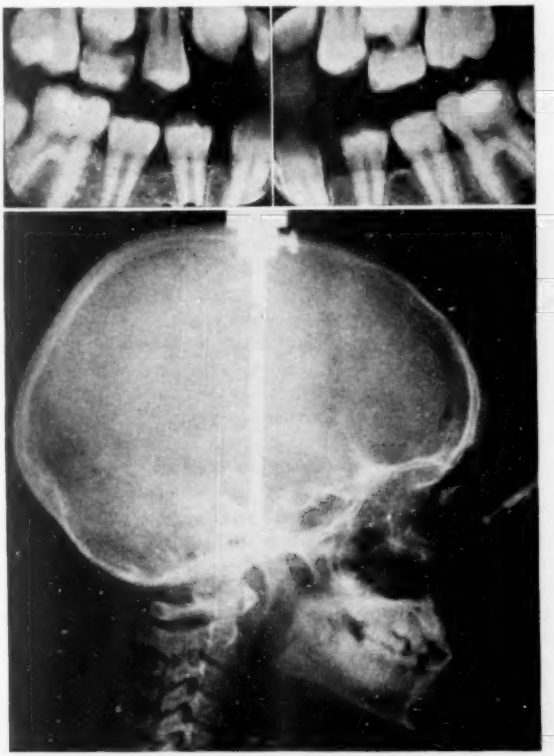


Fig. 2 • Upper: Roentgenograms showing space between permanent lower cuspids and first bicuspids. Lower: Profile roentgenogram of same child showing good facial skeleton and axial inclinations of upper and lower first permanent molars

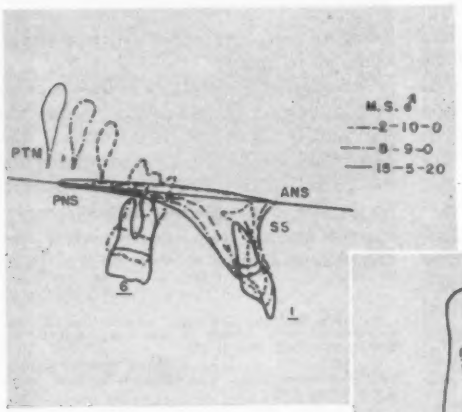
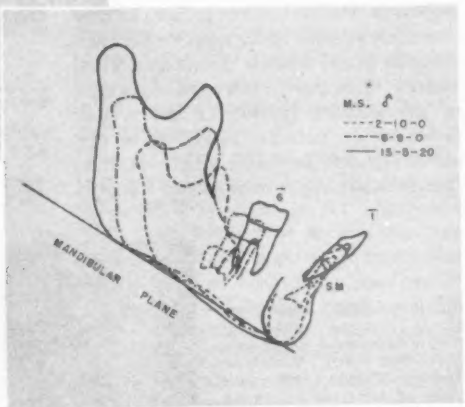


Fig. 3 • Left: Tracings of comparable roentgenograms showing changes in upper incisor and molar positions during childhood. PTM: pterygomaxillary gap; PNS: posterior nasal spine; ANS: anterior nasal spine; SS: subspinale



Right: Tracings of comparable roentgenograms showing changes in lower incisor and molar positions during childhood. SM: supramentale

greater labial inclination. When the axis of the lower incisor was related to the mandibular plane (plane through the chin point and angle of mandible), similar variations were evident from age 7 to maturity; some showed no change, some changed to a smaller labial inclination and some changed to a greater labial inclination.

When the axis of the upper incisors was related to the axis of the lower incisors, likewise some showed no change, some showed less angulation and some more angulation. Changes in these relations among the individuals occurred in a great variety of combinations. Apparently, the alterations that may occur in the anteroposterior axial inclinations of the incisors during eruption and alveolar growth may or may not tend to increase dental arch length.

The direction of the eruptive path of the incisors should not be considered alone. Other factors, especially the question of the stability of the permanent first molars, must be considered in relation to the incisors. Figure 3 illustrates the interrelation of these factors. Tracings of standardized lateral head roentgenograms of the same child at approximately 3, 9 and 15 years of age are superimposed to show anteroposterior and vertical changes in the molar and central incisor positions.[19]

The maxillary tracings (Fig. 3, left) are superimposed on the palate with subspinale in register on a perpendicular to a line through the posterior nasal spine

19. Koenig, A. H. Serial radiographic study of the head in norma lateralis during childhood. Thesis presented in partial fulfillment of the Master of Science in Dentistry degree. University of Minnesota, 1952.

and anterior nasal spine. A comparison of the observations at the three ages shows little anterior shifting of the upper first molar and sufficient anterior shift of the incisor to increase the molar to incisor distance.

The mandibular tracings (Fig. 3, right) superimposed on the mandibular plane with supramentale in register on a perpendicular to that plane show the same arch length increase between ages 2 years 10 months and 8 years 9 months. However, the molar to incisor distance decreased between ages 8 years 9 months and 15 years 5 months 20 days even though the incisor continued to shift anteriorly. In this instance one factor, the amount and direction of incisor eruption, was favorable to an arch length increase; but another factor, the amount and direction of the molar shift, was unfavorable and more than offset the favorable effect of the incisor change.

CONCLUSIONS

An examination of these eight generally accepted principles relating jaw growth and tooth eruption to space maintenance shows that all but one of them may vary from child to child. Some of these concepts relate to changes that are likely to increase arch length and others to changes that are likely to decrease arch length. These generalizations provide a background for intelligent observation of a child's growth changes although available statistics do not provide dependable bases for predicting the outcome of any one child's developing occlusion. Rather, all factors must be evaluated according to the conditions present in each child. This evaluation must include appraisal of the many associated influences that may change either the direction or the amount of each factor's effect on arch length. Analysis of a child's space maintenance problem is a highly individualized problem, frequently requiring painstaking assemblage and interpretation of information bearing on the possible and probable changes in the positions of the teeth.

Jaw growth and tooth eruption are two of the influences that must be considered in their association with all the component forces that surround the teeth during and after eruption. In one child these forces may tend to move teeth in favorable directions, in another child in unfavorable directions; and in still another child they may be so nearly in balance that they produce relative stability of tooth positions.

The recognition and interpretation of signs and symptoms that provide clues to the conditions present in each child and the probable future of those conditions is the difficult task of a dentist who wishes to formulate the best possible treatment plans for his patients.

Peace of Mind • "This is the gift that God reserves for His special proteges," he said. "Talent and health He gives to many. Wealth is commonplace, fame not rare. But peace of mind He bestows charily." *Joshua Loth Liebman, Peace of Mind.*

Instrumentation for veneer crown preparation

Claude Rowe Baker, M.S., D.D.S., Chapel Hill, N. C.

The purpose of this investigation was to make a thorough study of the popular clinical routines and of the instrumentation for the preparation of a natural tooth to receive a full veneer metallic crown, and to suggest, if possible, a more efficient order of procedure and to develop tools better adapted to meet the clinical specifications.

There are two methods of approach when one attempts to find the answer to a problem. One method is to select a probable answer at random and then set about to prove whether it is correct or false and, if it is incorrect, to select another answer and repeat the process until a solution is found. The other is to collect data available on the problem and utilize it as a basis for reaching conclusions. The latter approach, which ordinarily is not employed by dental clinicians when they attempt to solve technical problems of this nature, was selected.

REVIEW OF STANDARD PROCEDURES AND INSTRUMENTATION

The technic of the preparation of the tooth for a full crown as presented in crown and bridge syllabi of dental schools in the United States was reviewed. The orientation of the steps in procedure and the instruments used for each step were recorded for comparative study. The same type of information was solicited also from a group of practicing dentists of reputation in the crown and bridge field. The results of a compilation of data from both sources are outlined in Table 1.

The preliminary study reveals a relative standardization in the technical step routine and the instruments used. A major problem arises as a result of the lack of a rotating instrument properly designed to reduce hard tooth tissue effectively and efficiently in the areas of the created axial line angles. The dentist's armamentarium does not include a means for cutting round corners, a contour necessary to veneer crown preparation. A comparison of the popular instruments used to effect this reduction (Step III, Table 1) shows so wide a variation in instrument selection that a generalization is impossible. It seems that rounding line angles presents an instrumental difficulty which is met by many unsystematically. The obvious need is a tool to do this job designed to meet accurate clinical specifications. Discussion of the principal shortcomings of the instruments commonly used in attempting to round the created axial line angles follows.

Rigid Flat Disk • The completed axial walls of the preparation must conform in general with the horizontal circumferential anatomy of the tooth. This disk

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Professor and head of the department of crown and bridge prosthodontics, School of Dentistry, University of North Carolina.

cuts a flat surface, not a contour. When it is used for making the proximal cuts, these virtually flat surfaces create four axial line angles with the subsequent buccal and lingual surface reductions, necessitating further instrumentation in order to provide a satisfactory axial surface contour. In addition, the presence of a tooth proximal to that being prepared markedly limits the extent of a lateral disk draw stroke, particularly in the attempt to round the created line angles, because of the possibility of damage to the proximal surface of the adjacent tooth with the edge of the disk. Although disks of this nature can be made to slip into the gingival crevice immediately on the proximal side in establishing the subgingival margination, the same diameter disk does not adapt itself to subgingival grinding in other areas without causing damage to the free gingival crest. The use of this disk intraorally in the required diameter is always a potential hazard, particularly in the posterior portion of the mandible because of interference from the tongue.

Rigid Cupped, or Saucer Disk • This disk shape is often selected for making proximal cuts because the disk angle may offer somewhat better access. It is employed most effectively by cutting with its edge while using a draw stroke which tends to shave away the surface. Such a method, however, requires great skill and the disk must be under full control at all times; otherwise undercuts will be created. In general, the clinical shortcomings of the flat disk apply to the cupped disk.

Flexible Disk • A flexible disk such as the one on the market that has the abrasive bonded to one surface of a paper disk core or one made of plastic or similar material reputed by the manufacturer to remain efficient in a wet field offers a fairly satisfactory method of surface grinding a contour around the axial line angles in continuity with the natural

Table 1 • Standard clinical procedure employed in full veneer metallic crown preparation*

Orientation of technical steps	Instrument used
I. Proximal cuts on mesial and distal surfaces	Rigid flat disk or rigid cupped or saucer disk
II. Buccal and lingual reductions	Stump wheel
III. Round line angles	Rigid flat disk Rigid cupped or saucer disk Flexible disks Pointed tapering stone Others in combination
IV. Complete subgingival margination	Tapering bullet-nosed abrasive point
V. Occlusal reduction	Selected points†

*Steps IV and V frequently reversed.
†See Figure 2D.

anatomy of the tooth throughout the occlusogingival extent or length of the preparation. Experience has shown, however, that these disks do not remain efficient for a long period of time in a wet field and as a consequence require continual replacement during the course of the preparation—a time-consuming and inefficient activity. The effective cutting area of the disk near its periphery is short-lived. When used for the application under consideration, the pressure applied in order to make the disk flex works to the detriment of the shape of the preparation and also contributes to heat production. If a rubber dam is used, the dentist must be constantly alert to the possibility of rapid heat generation, a factor often responsible for painful tooth reaction following such instrumentation, particularly if the heat created is disguised by the local anesthetic. This type of disk may be made to enter the gingival crevice with comparative ease while the abrasive remains effective near its outer border and does a fair job of completing the subgingival margin of the preparation with little damage to the proximal free gingiva provided that the disk does not exceed a half inch in diameter. The area occupied by

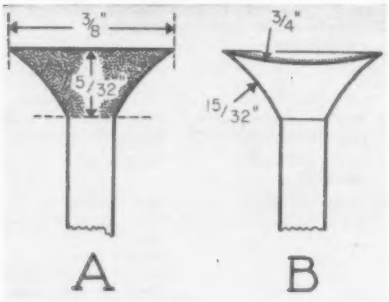

Fig. 1 • Veneer tool head dimensions. Note that A, veneer tool I, has abrasive bonded to lateral concave surface only, whereas B, veneer tool II, has abrasive bond alone on cupped end

the bulk of the disk-holding wedge, pin or screw is also an important factor to be considered because it may interfere with the axial wall itself. The selection of a suitable disk, regardless of whether the core is rigid or flexible, is always a problem since a diameter sufficient to grind or cut the surface extent of the occlusogingival distance of the crown preparation will probably be useless for extensive use subgingivally because of the danger of creating severe gingival bruises or cuts with the edge of the disk.

Pointed Tapering Stone • For completing the subgingival margination of the preparation throughout a large part of the circumferential diameter, the dentist most frequently selects from a variety of sizes of tapering bullet-nosed stones or points. The exception is in the case where a close interproximal area would not allow space to introduce a stone without damage to the adjacent tooth. Although it is used with reasonable success, there are inherent technical difficulties involved: (1) the effective cutting area of the tool is extremely small, and as a consequence it requires high operating speed in comparison with tools of greater radius, and (2) it brings abrasive in contact with soft tissue as well as hard if the preparation is being carried into an area fundamental to its purpose. In the latter instance, unless some means of pressure application is devised to withhold the free gingival crest from the field of operation, damage to this soft tissue results. It would not be out of order to say that many full crown preparations fall short of correct gingival extension. It is clumsy and inefficient to use this point to reduce the unprepared triangular area that remains in the gingival third following the proximal disk cuts and the buccal or lingual surface reductions in the axial line angle areas even though damage to the adjacent tooth may have been avoided. Tools of this design are best adapted to use immediately along the buccal and lingual surfaces for completing the subgingival margin of a preparation when limited use is required.

METHOD

A series of 200 stone casts of adult dental arches, some completely dentulous, some partially so, was used as a laboratory counterpart of average clinical crown and bridge cases. A band-saw cut was made in a horizontal plane through the posterior teeth approximately at the junction of the middle and gingival thirds of the anatomic crowns. The cut surfaces of the casts were placed on paper and the outline of the posterior teeth traced with a sharp pointed stylus. A machinist's radius gauge was used to measure the curvature at the four areas where the mesial and distal surfaces meet the buccal and lingual. From the recorded measurements a mean radius was computed. This radius was used to design a single rotating tool intended to reduce the rounded tooth surfaces in these areas. The design provides for the greatest amount of abrasive in contact with the surface being prepared on a curved triangular core which will allow for serviceable introduction into the smallest of the embrasures (Fig. 1).

Veneer Tool Specifications • Diamond abrasive bonded to a lathe-turned steel core shaped as described was the logical choice since in recent years the use of diamond as an effective agent for grinding hard tooth tissue has met almost universal acceptance. Further, the inherent strength of the steel core insures maintenance of its original shape regardless of use. Another reason for the choice of a diamond tool make-up is the possibility of highly polished nonabrasive surfaces that have a decided functional intention in this particular tool design which will be made clear in the clinical application.

Two diamond instruments of this shape are required. One of these (Fig. 1 B) must provide abrasive on the cupped end, the concave sides being highly polished, for use around the mesial surface; on the other (Fig. 1 A) the positions of the abrasive and polished surfaces are reversed for use around the distal surface. It should be noted that the peripheral edges of the tools are not sharp, that they are free of abrasive, and that they are highly polished. An experienced dental diamond tool manufacturer of sound reputation was enlisted to produce to specification a limited number of trial instruments.

CLINICAL APPLICATION AND RESULTS

The tools were designed to perform a specific function and were used only for that function. Figure 2 A, B and C shows their use in reducing axial contours, the direction of application, and the average areas of effective usefulness of each in preparing a posterior mandibular molar to receive a full metallic veneer crown.

There are distinct points in the use of these veneer tools which differ from the common use of larger diameter rigid or flexible disks:

1. The leading edges of the tools do not carry abrasive and as a consequence cannot be used to cut or slice into or through tooth structure. They are smooth and highly polished to insure against damage to an adjoining tooth.

2. With the concave cutting surface of the tool applied against the buccal or lingual axial corner of the tooth, the area is ground to meet an individual preparation requirement by varying the tool head position as the reduction progresses around and onto the proximal surface (Fig. 2 A, B).

3. Two concave surfaces meet at a leading edge in the tool head design

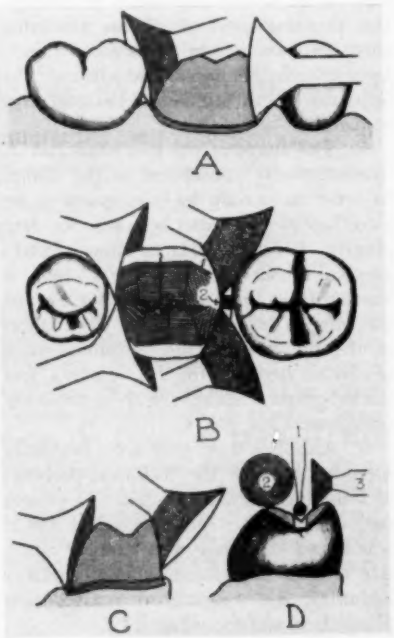

Fig. 2 • A, B, and C illustrate common position relationships taken by veneer tools in reducing axial contours. On occasion, an island of tooth structure, B2, may remain outside the reach of the veneer tools. Occlusal reduction, D, is accomplished by first establishing the pit depths with round bur, 1, followed by several cusp surface depth cuts with a small disk, 2, and completed by following out the anatomic contour required with an inverted cone point, 3

Table 2 • Procedure employed in full veneer metallic crown preparations using veneer tools

Orientation of technical steps	Instrument used
I. Occlusal reduction	Selected points*
II. Axial reduction	Veneer tools I & II (straight or right angle handpiece)
III. Proximal contact areas†	Rigid flat disks

*See Figure 2B, 2.
†If required.

forming a relative fit within an interproximal embrasure (Fig. 2 B).

4. It is almost impossible to damage the proximal surface of an adjoining tooth because it can be contacted only by a smooth highly polished surface. The adjoining tooth often may be used as a tool rest.

5. The shape of the tool head and its diameter were considered in the design in order to permit the instrument to be introduced with ease beneath the free gingiva. Polished surfaces alone contact gingival tissue. As a veneer tool is worked from the occlusal surface toward the gingival margin around the corners of the preparation, the peripheral edge is carried beneath the free gingiva and the subgingival margins in these areas are completed (Fig. 2 A, C).

6. Although these tools were primarily intended to solve the technical problem of rounding the axial corners of a veneer preparation, when put to clinical test it was found that they were equally effective on the buccal and lingual surfaces including the subgingival margination along these surfaces (Fig. 2 C).

7. Experience with the instruments in a number of timed preliminary intraoral test preparations established a procedure oriented as shown in Table 2.

The instrumentation suggested in Table 2 will meet the needs of most cases. If the tooth being prepared is wide buccolingually, it may be that a small portion of a contact area may remain unprepared and require completion with a safe-sided disk as in the conventional manner (Fig. 2 B, 2). The latter procedure may be resorted to in order to assure proximal wall parallelism in certain bridge cases. Sometimes a touch-up with a bullet-nosed stone immediately along the buccal or lingual surfaces to define or accentuate the subgingival margination may be desirable. Most individuals must adapt a manual technic somewhat in order to suit best their own needs.

The occlusal area should be the first reduced regardless of the instrument or technic employed. A suggested instrumental orientation is shown in Figure 2 D.

8. In order to determine the clinical value of the research and of the tool design developed therefrom, the trial instruments were put to use by a number of interested and experienced practicing dentists and by 35 clinically inexperienced dental students in their introduction to the technic of full veneer crown preparation.

The clinical results reported by the dentists demonstrate a considerable reduction in the time required for a full veneer crown preparation because of the minimal number of instrument changes and the relief from the tension of doing the job with inappropriate instruments.

The inexperienced student group demonstrated without question an ease of understanding and acceptance of the technical procedure, and the laboratory time was materially reduced in comparison with the time required by other student groups of similar experience who were instructed in the generally accepted standard pattern of procedure as outlined in Table 1.

SUMMARY

It was evident from a study of the orientation of technical step procedures

and of the armamentarium common to modern dental practice in the preparation of a tooth to receive a full veneer metallic crown that the absence of a rotating tool or tools designed to reduce rounded tooth surfaces to conform with the preparation requirements posed a major instrumental problem. An attempt to design tools of relatively universal application to meet the clinical requirements became the object of the study. Veneer tools were designed which, when put to clinical use, proved to be of value in materially reducing the preparation time by increasing the efficiency of the operation.

The status of fluoridation programs in the United States, its territories and possessions

W. Philip Phair, D.D.S., M.P.H., and Marian F. Driscoll,† A.B., Chicago*

A survey completed by the Council on Dental Health in August, 1952, revealed that nearly 8,000,000 persons in 367 United States communities are receiving fluoridated water and that more than 16,000,000 additional people are scheduled to benefit soon from the public health measure by official actions of approval in 317 other communities. When these 317 projects are in operation, there will be approximately 24,000,000 people in the United States receiving fluoridated water in addition to some 4,000,000 who are known to be served by water with natural fluoride concentrations higher than 0.7 ppm.[1] All figures in this narrative report are exclusive of the territories and possessions which have been included in Table 3.

Questionnaires were mailed to all state and territorial health departments requesting specific information on fluoridation programs in their respective areas. In some instances, information was received directly from local officials. The survey was not related to the natural occurrence of fluorides in public water supplies. Information was received from Alaska, the District of Columbia, Hawaii, Panama Canal Zone, Puerto Rico, and all states except Arizona. Hawaii, Missouri, Nevada and Utah reported that there were no communities where official action had been taken on fluori-

Since this survey was completed, information has been received in the Central Office indicating that the total number of communities receiving fluoridated water as of September 30, 1952, was 423. These communities are served by 274 separate water systems. The total number of communities that had approved fluoridation and were planning to start operation was 305 as of September 30.

*Assistant secretary, Council on Dental Health, American Dental Association.

†Executive assistant, division of dental health education, Council on Dental Health, American Dental Association.

1. Task Group E5-10. Committee on fluoridation materials and methods, American Water Works Association. Natural and applied fluoridation census. J.A.W.W.A. 44:553 (June) 1952.

dation, and these areas are not included in Table 3.

The fluoridation program is gaining momentum as is evidenced by the fact that more than 40 per cent of the communities now receiving fluoridated water began their projects during the first seven months of 1952 and that nearly half of the new official approvals were given during this same period. In view of the fact that only 28 communities were using fluoridated water in late 1949 when fluoridation was recommended by the American Dental Association, the rapid progress made in this important public health measure is noteworthy.

According to a recent estimate, there are 16,747 public water supplies in the United States[2] and at least 1,401 of these have a natural fluoride concentration higher than 0.7 ppm.[1] Frequently more than one community is served by one supply. For instance, the 367 communities now receiving fluoridated water are served by 256 separate water systems, and the 317 communities where the procedure has been approved are served by 283 separate water systems.

If the gains made during the last few years can be used as some indication of the progress that will be made in the future, a mathematical estimate will give the hypothetical date of 1975 as the year when all fluoride-deficient public water supplies in the United States will have been fluoridated. This date is 23 years hence and highly problematical, but it is possible that the adoption of fluoridation programs will increase at an even greater rate and that the majority of public water supplies will have been fluoridated before 1975.

UNFAVORABLE ACTIONS

Progress is being made in spite of the fact that many objections have been raised by the misinformed and by those who have chosen to oppose the measure, apparently for reasons of financial and political expediency or personal notoriety. Such persons have been largely responsible for unfavorable official actions in 39 communities: fluoridation was defeated in 22 referendums and four town meetings; city councils acted unfavorably in 12 instances, and the measure was opposed by the utility board in one community.

In three other communities the procedure has been discontinued, two as the result of referendums (Stevens Point, Wis. and Mount Dora, Fla.) and the other because of local controversy (Assumption, Ill.). These are the only three projects reported to have been halted after inauguration that have not yet resumed operation. Fluoridation was stopped for a few months in Charlotte, N. C., because of a problem in the ice manufacturing industry, but this problem was solved by procedures common to the industry and fluoridation was resumed. A temporary injunction halted the fluoridation program for a short time in Northampton, Mass., but the injunction was dismissed by court action. No court has, as yet, permanently restrained fluoridation.

METHOD OF APPROVAL

In the majority of instances, approval of the measure came through action of city councils or similar bodies, depending on the local governmental organization. Approval was obtained in 22 out of 45 instances where referendums were involved; the measure was acted on favorably at 10 of 14 town meetings in New England.

COMPOUND USED

The first choice of chemical, according to the reports, is sodium fluoride (NaF) which is used in 137 projects. Sodium

2. Bachman, George W., and associates. Health resources in the United States. Washington, D. C., The Brookings Institution, 1952, p. 207.

silicofluoride (Na_2SiF_6) is used in 104 projects, hydrofluosilicic acid (H_2SiF_6) in 26 projects and hydrofluoric acid (HF) in one project (Table 1).

Twelve Wisconsin projects started with sodium fluoride and later changed to sodium silicofluoride. An earlier report indicated that practically all water plants use dry feed units for sodium silicofluoride while half of the plants employing sodium fluoride use solution feeders and the other half, dry feeders.[1]

COST PER CAPITA

The annual per capita cost ranges from less than two cents ($0.018) to 25 cents. It appears that per capita cost figures are usually submitted on the basis of the annual expenditure for the fluoride compound. Waterworks operators state that added labor costs for fluoridation usually are negligible and difficult to ascertain. In 27 Wisconsin cities, however, estimates were made for a proportion of water plant labor costs which might be applied to fluoridation. These costs are not included in the table, but were estimated to run between one and 20 cents per capita and averaged seven cents. The questionnaire requested that equipment costs not be included in the annual per capita costs. Information on this subject is included in the Council's booklet "Fluoridation in the Prevention of Dental Caries," published in August, 1952.

Table 1. Number of water systems employing various fluoride compounds by year fluoridation began*

Year fluoridation began	NaF	Na_2SiF_6	H_2SiF_6	HF
1945-49	24	9	0	1
1950	16	13	1	0
1951	52	43	15	0
Jan-Aug. 1952	45	39	10	0
Totals	137	104	26	1

*One city reported use of both NaF and Na_2SiF_6 and another city reported use of both Na_2SiF_6 and H_2SiF_6.

Table 2. Average annual per capita cost of fluoridation according to fluoride compound employed

	NaF	Na_2SiF_6	H_2SiF_6
Number reporting cost	70	63	7
Highest cost	$0.232	$0.25	$0.14
Lowest cost	0.02	0.025	0.018
Average cost	0.096	0.077	0.10

Where sodium fluoride is employed, the average annual per capita cost is about nine and a half cents; for sodium silicofluoride, the cost is slightly more than seven and a half cents, and for seven projects using hydrofluosilicic acid, the average cost is 10 cents (Table 2).

HOW FINANCED

The majority of projects are financed by funds received by the water department from the sale of water. Several projects that were reported to be financed through the city budget for the water department are arbitrarily listed under "general funds." Of the 367 projects in operation, the method of financing is listed for 167 as follows: 61 through general funds (regular city budget), 93 through water revenues and 13 by other means which are listed in the "comments" column.

The questionnaire requested information as to whether water rate increases were necessary to finance the project. Only four indicated that an increase was necessary, while 21 others specifically stated that increases were not made.

COMMENT

The Council endeavors to keep current information on the status of fluoridation throughout the country. It is hoped that dentists, state health department personnel and other persons concerned will help supply information on each project as official approval, implementation or unfavorable community actions occur.

Table 2. — Facts regarding fluoridation progress in the United States, its territories and possessions, August 1952

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		A. Approved	B. Operating	Undesirable water		Local governmental	Electorate	Other	Fluaride	Fluosilicate	Fluorsilicic acid		General tax	Water revenue	Other	
ALABAMA:																
Tuscaloosa*	52,734		X		July 1952	X				X		$0.08	X			
Hall			X													
Northport			X													
Totals		0	3	0		1	0	0	0	1	0		1	0	0	In operation 52,734
ARKANSAS:																
Jonesboro	17,692		X		Oct. 1951	X			X						X	No increase in water rates
Nettleton			X													
Little Rock	146,310		X		Apr. 1951	X			X						X	No increase in water rates
No. Little Rock			X													
Walnut Ridge	3,109		X		July 1952	X			X						X	No increase in water rates
Totals		0	3	0		2	0	0	2	0	0		0	0	2	In operation 149,108
CALIFORNIA																
Alameda	64,430	X			1952	X										
Antioch	11,051		X		?	X										
Belmont	3,367	X			Apr. 1952		X									
Berkeley	113,805	X			1951	X										
Carmel	4,351			X	June 1952		X									
Cloverdale	1,292			X	Apr. 1952		X									
Colusa	3,031	X			May 1952	X										
Fresno Co. Water Districts 1 & 2	178,565	X			June 1952			X								
Grass Valley	5,283	X			Feb. 1951		X									
Hayward	14,272	X			Apr. 1952		X									
Healdsburg	3,258	X			Apr. 1952		X									
Martinez	8,268	X			Apr. 1952		X									
Monterey	16,205			X	June 1952		X									
Morgan Hill	1,627		X		Apr. 1952	X			X							
Oakdale	4,064			X	Apr. 1952		X									

Oakland	384,575	X			1951	X										
Pacific Grove	9,623			X	June 1952		X									
Placerville	3,749	X			Apr. 1952	X										
Pleasanton	2,244	X			1951	X										
Richmond	99,545	X			1952	X										
Rio Vista	1,831		X		Oct. 1951	X			X			†		X		
Roseville	8,723	X			Apr. 1952		X									
San Bruno	12,478			X	Apr. 1952		X									
San Carlos	14,371			X	Apr. 1952		X									
San Diego	334,387	X			1951	X										City won nonsuit to restrain program; new trial denied in superior court
San Francisco	650,000		X		Aug. 1952		X									Serves mainly residential districts, not entire population
San Leandro	27,542	X			1952	X										
Santa Cruz	21,970			X	June 1952		X									Previously approved by City Council
Santa Maria	10,440			X	Apr. 1952		X									
Santa Rosa	17,902			X	Apr. 1952		X									
Sunnyvale	9,829	X			Mar. 1952	X										
Woodlake	2,525	X			Apr. 1952		X									
Totals		18	4	10		13	18	0	2	0	0		0	2	0	Approved: 1,269,598 In operation: 664,509
COLORADO																
Grand Junction	20,000		X		June 1951	X				X		0.10	X			No increase in water rates
Johnstown	897	X			June 1952	X										
Loveland	6,773	X			May 1952	X										
Montrose	4,864	X			1950	X										
Palisade	861	X			1951	X										
Totals		4	1	0		5	0	0	0	1	0		1	0	0	Approved: 13,395 In operation: 20,000
CONNECTICUT																
Cromwell	2,500		X		June 1951		§		X			0.232		X		
Mansfield State Training School	1,725		X		Sept. 1950			X	X			0.128	X			Approved by board of trustees
New Britain	80,000		X		Dec. 1950	X			X			0.12		X		
Southbury State Training School	1,800		X		Apr. 1945			X	X			0.128	X			Approved by board of trustees
Wallingford	17,000	X			Dec. 1951	X										
Yalesville		X														
Totals		2	4	0		2	1	2	4	0	0		2	2	0	Approved: 17,000 In operation: 86,025

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
DELAWARE																
Dover	6,200	X			Apr. 1951	X										
Newark	7,200		X		Jan. 1951	X			X			0.052	X			No increase in taxes
Smyrna	2,346	X			June 1952	X										
Totals		2	1	0		3	0	0	1	0	0		1	0	0	Approved: 8,546 In operation: 7,200
FLORIDA																
Clewiston	2,499		X		Oct. 1951	X				X		†	X			
Gainesville	26,861		X		Oct. 1949	X			X			0.066	X			
Lakeland	30,851			X	1951	X										Temporary ordinance expired; not renewed
Miami	249,276		X		Apr. 1952	X				X		†	X			
Coral Gables	19,837		X													
Hialeah	19,676		X													
Miami Beach	46,282		X													
Miami Shores Village	5,086		X													
Miami Springs	5,018		X													
South Miami	4,809		X													
West Miami	4,043		X													
Mount Dora	3,028			X	Aug. 1952		X									Fluoridation discontinued
Naples	1,365		X		Oct. 1951	X			X			†	X			
Sanford	11,935	X			1951	X										
Tallahassee	27,237	X			1951	X										
Totals		2	11	2		7	1	0	2	2	0		4	0	0	Approved: 39,172 In operation: 384,302
GEORGIA																
Athens	28,000		X		Feb. 1951	X			X			0.06	X			
Dekalb County	75,000				Apr. 1951	X				X		0.15		X		
Avondale			X													
Brookhaven			X													
Chamblee			X													
Clarkston			X													

Decatur			X													
Doraville			X													
Druid Hills			X													
Dunwoody			X													
Norcross			X													
Panthersville			X													
Redan			X													
Scottdale			X													
Tucker			X													
Gainesville	11,936	X				†	†									
Montezuma	2,921	X				†	†									
Rome	29,615	X				†	†									
Rossville	3,892	X														
Waycross	18,899	X				†	†									
Totals		5	14	0			2	0	0	1	1	0		1	1	0	Approved: 67,263 In operation: 28,000
IDAHO																
Bonners Ferry	3,500		X		Mar.	1952	X				X		0.11		X		
Coeur d'Alene	14,000		X		Jan.	1952	X				X	X	0.14		X		Private utility. Reported use of two compounds
Lewiston	13,400		X		June	1947	X			X			0.22		X		Study project
Lewiston Orchards	4,000		X		June	1952			X		X		0.05		X		Approved by Irrigation District Board
Preston	4,500		X		Jan.	1952	X				X		0.25		X		
Salmon	2,700	X			Apr.	1952	X										
Sandpoint	4,500		X		Apr.	1952	X				X		0.25		X		
Kootenai	250		X														
Ponderay	250		X														
Totals		1	8	0			6	0	1	1	5	1		0	6	0	Approved: 2,700 In operation: 44,400
ILLINOIS																	
Assumption	1,466			X	Apr.	1952	X										Program discontinued because of local controversy
Carbondale	10,911	X			Sept.	1951	X										
Carlyle	2,666		X		June	1952	X			X			†	X			
Beckemeyer	1,045		X														
Chester	5,366		X		Dec.	1951	X				X		†	X			
Evanston	73,030		X		Feb.	1947	X			X			0.107			X	Study project financed by local, state and federal health departments
Skokie	14,832		X														
Freeport	22,425	X				†	X										
Lawrenceville	6,351	X			Jan.	1952	X										
Morton Grove	3,926	X			June	1952	X										
Park Forest	8,138	X			June	1952	X										

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
ILLINOIS—Continued																
Park Ridge	16,602			X	Apr. 1952	X										Approved by City Council, vetoed by Mayor
Ridgway	890	X			†	X										
Rockford	92,503	X			Apr. 1952		X									
Waukegan	39,099		X		Apr. 1952	X				X		†	X			
Totals		7	6	2		12	1	0	2	2	0		3	0	‡	Approved: 145,144 In operation: 136,038
INDIANA																
Batesville	3,900		X		Apr. 1952	X			X			0.08	X			
Oldenburg			X													
Bedford	13,756		X		Jan. 1952	X				X		0.07	X			
Oolitic			X													
Columbus	18,365		X		Jan. 1952	X				X		0.09	X			
Culver	1,563	X			Apr. 1952	X										
Fort Wayne	132,840		X		July 1951	X				X		0.06	X			
Goshen	13,008	X			June 1952	X										
Greensburg	6,619	X			June 1952	X										
Hammond	87,594	X			Apr. 1952	X										
Huntingburg	4,057		X		Aug. 1951	X				X		0.05	X			
Indianapolis	484,693		X		Aug. 1951			‡	X	X		0.08		‡		Reported use of two compounds
Beech Grove			X													
Ben Davis			X													
Mars Hill			X													
Southport			X													
Woodruff Place			X													
Kokomo	38,672	X			June 1952	X										
Lyons	692		X		Apr. 1952	X			X			0.09	X			
Michigan City	28,379		X		Apr. 1952	X			X			0.14	X			
New Carlisle	747	X			Dec. 1951	X										
Tell City	5,768		X		May 1952	X			X			0.09	X			

Valparaiso	12,028	X			May 1952	X										
Zionsville	1,533		X		Nov. 1951	X			X			0.09	X			
Totals		7	17	0		16	0	1	6	5	0		9	1	0	Approved: 160,231 In operation: 693,983
IOWA																
Audubon	2,802	X			May 1952	X										
Cedar Rapids	72,149		X		Apr. 1952	X			X			0.10		X		Water rate increase five cents per month
Clarinda	5,077	X			May 1952	X										
Clinton	30,151			X	Mar. 1952	X										
Creston	8,302	X			May 1952	X										
Davenport	73,640	X			Mar. 1952	X										
Bettendorf	5,110	X														
Dubuque	49,528		X		Oct. 1951	X			X			0.10		X		
Eagle Grove	4,167	X			May 1952	X										
Fairfield	7,042	X			May 1952	X										
Fort Madison	14,943			X	May 1952	X										
Harlan	3,888	X			May 1952	X										
Hartley	1,614	X			May 1952	X										
Indianola	5,146	X			May 1952	X										
Iowa City	27,018	X			May 1952	X										
Coralville	433	X														
University Heights	261	X														
Knoxville	7,604	X			May 1952	X										
Manchester	3,969	X			May 1952	X										
Perry	6,161	X			May 1952	X										
Waukon	3,150		X		Oct. 1951				X			0.10		X		
Totals		16	3	2		17	0	0	3	0	0		0	3	0	Approved: 162,234 In operation: 124,827
KANSAS																
Arkansas City	14,021	X			Feb. 1952	X										
Baldwin	1,329	X			Dec. 1951	X										
Coffeyville	18,147	X			Feb. 1952	X										
Colony	397	X			Feb. 1952	X										
El Dorado	11,878	X			Feb. 1952	X										
Fort Scott	10,447		X		Aug. 1952	X				X		†			†	
Garnett	2,659		X		June 1952	X					X	0.10		X		
Hays	8,551	X			Mar. 1952	X										
Holton	2,602			X	Mar. 1952		X									
Horton	2,895		X		Nov. 1951	X					X	0.11		X		
Iola	6,939	X			Jan. 1952	X										
Junction City	13,682		X		Jan. 1952	X				X		0.055		X		
Lawrence	18,745	X			Dec. 1951	X										
McPherson	8,586	X			†	X										
Minneapolis	1,809	X			Feb. 1952	X										

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
KANSAS—Continued																
Ottawa	10,148		X		Sept. 1946	X			X			0.08		X		
Paola	4,152	X			May 1952	X										
Seneca	1,945		X		Aug. 1952	X					X	†			†	
Topeka	91,058	X			†	X										
Totals		12	6	1		18	1	0	1	2	3		0	4	0	Approved: 185,612 In operation: 41,776
KENTUCKY																
Ashland	31,131	X			†	X										
Central City	4,110		X		Mar. 1952	X				X		0.09	X			
Cynthiana	4,832		X		Mar. 1952	X				X		0.06	X			
Elizabethtown	5,807		X		July 1951	X				X		0.05	X			
Franklin	4,343		X		May 1952	X				X		0.06	X			
Glasgow	7,025		X		Feb. 1952	X				X		0.05	X			
Greensburg	1,476		X		Apr. 1951	X					X	0.10	X			
Hopkinsville	15,500		X		Aug. 1951	X			X			0.06	X			
Louisville and county	450,000		X		Aug. 1951	X				X		0.07	X			
Martin	1,170		X		Apr. 1952	X			X			0.05	X			
Mayfield	9,000	X			Jan. 1952	X										
Maysville	11,572		X		Apr. 1951	X				X		0.06		X		
Paintsville	4,307		X		Apr. 1952	X					X	0.12	X			
Versailles	2,760	X			†	X										
Totals		3	11	0		14	0	0	2	7	2		10	1	0	Approved: 42,891 In operation: 510,142
LOUISIANA																
Baton Rouge	125,629	X			†	X										
Donaldsonville	4,150	X			†	X										
East Jefferson Parish Water District	100,000	X			Apr. 1952		X									
Homer	4,749	X			†	X										
Jennings	9,663	X			†	X										
Morgan City	9,759	X			†	X										

Natchitoches	9,914	X			†	X										
New Orleans	545,000			X	†	X										
Oak Grove	1,796	X			†	X										
Port Sulphur	1,050	X			†			X								Approved by industrial management
St. Martinville	3,500		X		Apr. 1952	X				X			†		X	
Shreveport	127,206	X			Sept. 1952	X										
Thibodaux	7,730	X			†	X										
Welsh	2,416	X			†	X										
Totals		12	1	1		12	1	1	1	0	0		0	1	0	Approved: 404,062 In operation: 3,500
MAINE																
Norway	3,811	X			Mar. 1951		X									Approved at Town Meeting
Totals		1	0	0		0	1	0	0	0	0		0	0	0	Approved: 3,811
MARYLAND																
Aberdeen	3,000	X			May 1951											Proposed plans not yet accepted by State Board of Health
Baltimore & County	1,200,000	X			May 1951	X										
Bel Air	2,600	X			May 1951	X										All Maryland projects reported initial costs borne by local governing agencies and no increase in water rates
Hagerstown	36,260		X		Dec. 1951	X				X			†		X	
Cavetown	1,206		X													
Funkstown	879		X													
Halfway	2,153		X													
Roxbury Penal Farm	864		X													
Security	231		X													
Smithsburg	641		X													
Williamsport	1,890		X													
Maryland Suburban Sanitary District	310,000				Mar. 1952	X				X			†		X	
Alta Vista			X													
Ardwick			X													
Beltsville			X													
Berwyn			X													
Bethesda			X													
Bladensburg			X													
Book Mont			X													
Bradbury Blvd.			X													
Bradbury Hts.			X													
Burnt Mills Village			X													

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
MARYLAND—Continued																
Cabon John			X													
Cabon John Park			X													
Capitol Heights			X													
Central Avenue			X													
Cheverly			X													
Chevy Chase			X													
Chillum			X													
College Park			X													
Edmondson			X													
Forest Glen			X													
Forest Heights			X													
Forestville			X													
Four Corners			X													
Gaithersburg			X													
Garrett Park			X													
Glendale			X													
Glen Echo			X													
Glen Mont			X													
Greenbelt			X													
Hampshire Gardens			X													
Hillendale			X													
Hyattsville			X													
Kenilworth			X													
Kensington			X													
Kenwood			X													
Landover			X													
Lanham			X													
Laurel			X													
Lenox			X													
Montgomery Mills			X													
Mt. Ranier			X													

Riggs Road			X													
Seat Pleasant			X													
Silver Hills			X													
Silver Spring			X													
Suitland			X													
Takoma Park			X													
Viers Mill			X													
Washington Grove			X													
West Gabe			X													
Wheaton			X													
Wood Acres			X													
Totals		3	60	0		4	0	0	0	2	0		0	2	0	Approved: 1,205,600 In operation: 354,124
MASSACHUSETTS																
Athol	11,554		X		Jan. 1952		X			X		0.04	X			
Ayer	5,740			X	Mar. 1952		X									
Belchertown State School	1,536		X		Nov. 1946			X	X			0.16			X	Approved and financed by State Dept. of Pub. Health
Cambridge	120,676	X			May 1951	X										
Danvers	15,720		X		May 1951	X				X		0.04	X			
Middleton	2,916		X													
Essex	1,794	X			Mar. 1952		X									
Gardner	19,617	X			July 1951	X										
Gloucester	25,167	X			Apr. 1952	X										
Hamilton	2,764	X			Mar. 1952		X									
Hingham	14,044	X			Feb. 1952			X								Approved by Boards of Health
Hull		X														
Hudson	8,211	X			Mar. 1952		X									
Manchester	2,868			X	Mar. 1952		X									
Needham	16,313			X	Mar. 1952		X									
North Andover	8,485			X	Mar. 1952		X									
Northampton	28,998		X		Feb. 1952	X			X			†	X			Temporary injunction dismissed June, 1952
Rockport	4,231	X			Mar. 1952		X									
Salem	70,764	X			May 1952			X								Approved by Boards of Health
Beverly		X														
Seekonk	6,104		X		Jan. 1952	X				X		0.03		X		
Sharon	4,847	X			Mar. 1952		X									
Shrewsbury	10,594	X			Mar. 1952		X									
Templeton	4,757		X		June 1951	X				X		0.04				
Williamstown	6,194	X			Feb. 1952		X									
Wilmington	11,441	X			Mar. 1952		X									
North Reading		X														

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
MASSACHUSETTS—Continued																
Winchendon	6,477	X			Aug. 1951	X										
Wrentham State School	2,224		X		Jan. 1947			X	X			0.16			X	Approved and financed by State Dept. of Health
Totals		17	8	4		8	13	4	3	4	0		4	1	2	Approved: 306,821 In operation: 73,809
MICHIGAN																
Algonac	2,639		X		Sept. 1949	X				X		†		X		
Ann Arbor	48,251		X		Dec. 1951	X				X		†		X		
Battle Creek	48,666		X		Apr. 1951	X			X			†		X		
Bay City	52,523		X		Jan. 1952	X				X		†		X		
Benton Harbor	18,769		X		Sept. 1951	X			X			†		X		
Buchanan	5,224	X			†	X										
Detroit	1,849,568	X			†	X										
East Lansing	30,325	X			†	X										
Edmore	971	X			†	X										
Flint	163,143	X			†	X										
Fremont	3,056	X			†	X										
Gladstone	4,831	X			†	X										
Grand Haven	9,536		X		†	X										
Grand Rapids	176,515		X		Jan. 1945	X			X			0.138			X	Study project: financed by U.S.P.H.S.
Grosse Pointe Farms	9,410		X		May 1951	X				X		†		X		
Hastings	6,096		X		Jan. 1951	X				X		†		X		
Ishpeming	8,962	X			†	X										
Jackson	51,088		X		Aug. 1951	X				X		0.055		X		
Kalamazoo (partially)	57,704		X		Aug. 1951	X			X			†		X		
Lake Odessa	1,596		X		Aug. 1952	X					X				†	
Ludington	9,506		X		Dec. 1949	X			X			†		X		
Marquette	17,202		X		Sept. 1951	X				X		†		X		
Marysville	2,534		X		Apr. 1952	X				X		†		X		
Midland	14,285		X		Jan. 1946	X				X		†			X	Financed by Dow Chemical

Monroe	21,467		X		Dec. 1951	X				X		†		X		
Mt. Clemens	17,027		X		Mar. 1951	X				X		†		X		
Muskegon	48,429		X		July 1951	X			X			†		X		
Muskegon Heights	18,828		X		Jan. 1952	X			X			†		X		
Negaunee	6,472		X		Nov. 1951	X				X		†		X		
Norway	3,258	X			†	X										
Saginaw	92,918		X		May 1951	X				X		†		X		
St. Joseph	10,223	X			†	X										
South Haven	5,629		X		Feb. 1952	X				X		†		X		
Sparta	2,327	X			†	X										
Stambaugh	1,967	X			†	X										
Sturgis	7,786	X			†	X										
Three Rivers	6,785	X			†	X										
Traverse City	16,974		X		May 1952	X			X					X		
Wyandotte	36,846		X		Jan. 1951	X				X		†		X		
Totals		14	25	0		39	0	0	8	15	1		0	21	2	Approved: 2,098,426 In operation: 790,910
MINNESOTA																
Appleton	2,256	X			1952	X										
Arlington	1,311		X		Jan. 1952	X			X			0.04		X		
Austin	23,035		X		May 1952	X				X		0.025		X		
Battle Lake	623	X			1951	X										
Benson	2,298		X		Jan. 1952	X			X			0.04		X		
Cloquet	7,663	X			1952	X										
Detroit Lakes	5,787	X			1952	X										
Duluth	101,065	X			1951	X										
Elbow Lake	1,400	X			1951	X										
Ely	5,474		X		Jan. 1952	X			X			0.095		X		
Fairmont	8,193		X		Feb. 1951	X				X		0.05		X		
Faribault	16,029	X			1952	X										Implementation of program postponed by City Council
Fergus Falls	12,917		X		May 1951	X				X		0.05		X		
Gaylord	1,229	X			1952	X										
Granite Falls	2,511		X		Jan. 1952	X			X			0.045		X		
Hallock	1,552		X		Jan. 1952	X			X			0.05		X		
Henning	1,004	X			1951	X										
Hutchinson	4,690		X		Feb. 1952	X			X			0.03		X		
International Falls	6,269	X			1951	X										
Mapleton	1,074	X			1952	X										
Minneapolis	521,718			X	Mar. 1952	X										
Montevideo	5,459		X		Sept. 1951	X			X			0.06		X		
Mora	2,018		X		May 1952	X			X			0.06		X		
Morris	3,809	X			1952	X										
New York Mills	977	X			1951	X										
Okabena	474	X			1952	X										

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
MINNESOTA—Continued																
Perham	1,926	X			1951	X										
Red Lake Falls	1,733		X		Feb. 1951	X			X			0.055		X		
Rush City	1,175	X			1952	X										
St. Paul	309,474	X			1951	X										
Staples	2,775		X		Apr. 1952	X			X			0.02		X		
Thief River Falls	6,926		X		Sept. 1951	X				X		0.04		X		
Two Harbors	4,400	X			1952	X										
West Concord	770		X		Sept. 1951	X			X			0.07		X		
Winnebago	2,127		X		June 1951	X			X			0.06		X		
Totals		18	16	1		35	0	0	12	4	0		0	16	0	Approved: 466,634 In operation: 83,789
MISSISSIPPI																
Columbus	17,172		X		Aug. 1951	X				X		0.075		X		
Forest	2,874		X		Feb. 1952	X				X		0.06		X		
Jackson	98,271	X			†	X										
Meridian	41,893	X			†	X										
Totals		2	2	0		4	0	0	0	2	0		0	2	0	Approved: 140,164 In operation: 20,046
MONTANA																
Bozeman	11,325	X			Aug. 1951	X										
Chinook	2,307		X		Mar. 1952	X				X		0.065	X			
Dillon	3,268	X			Jan. 1952	X										Soroptomist Club underwriting finances
Fort Belknap Indian Agency	141	X			May 1952			X								Approved by officials of Indian reservation
Roundup	2,856		X		Feb. 1952	X			X			0.07	X			
Totals		3	2	0		4	0	1	1	1	0		2	0	0	Approved: 14,734 In operation: 5,163
NEBRASKA																
Beatrice	11,813		X		Apr. 1951	X				X		0.078	X			
Fairbury	6,395		X		Mar. 1952	X				X		0.086	X			

Nebraska City	6,872	X			Nov. 1951	X											
Superior	3,227		X		July 1951	X				X		0.076	X				
Totals		1	3	0		4	0	0	0	3	0		3	0	0	Approved: 6,872 In operation: 21,435	
NEW HAMPSHIRE																	
Claremont	15,000			X	†	X											
Concord	28,000		X		May 1952	X				X		0.07	X				
Totals		0	1	1		2	0	0	0	1	0		1	0	0	In operation: 28,000	
NEW JERSEY																	
Allenhurst	758	X			Nov. 1951	X											
Atlantic City	61,657	X			July 1952	X											
Monmouth County					†												
Asbury Park	17,094	X				X											
Bradley Beach	3,911	X				X											
Deal	1,064	X				X											
Eatontown	3,044	X				X											
Fair Haven	3,560	X				X											
Interlaken	833	X				X											
Little Silver	2,595	X				X											
Long Branch	23,090	X				X											
Middletown Township	16,203	X				X											
Monmouth Beach	806	X				X											
Neptune City	3,073	X				X											
Neptune Township	13,613	X				X											
New Shrewsbury Borough		X				X											
Ocean Grove	3,806	X				X											
Ocean Township	6,734	X				X											
Oceanport	7,588	X				X											
Rumson	4,044	X				X											
Sea Bright	999	X				X											
Shrewsbury Borough	1,615	X				X											
Shrewsbury Township	5,171	X				X											
West Long Branch	2,739	X				X											
Morristown	28,000		X		June 1950	X			X			0.11		X			
Rahway	21,290	X			Oct. 1951	X											
Totals		24	1	0		25	0	0	1	0	0		0	1	0	Approved: 205,286 In operation: 28,000	
NEW YORK																	
Amsterdam	33,000	X			Jan. 1952	X											
Bath	5,416	X			Mar. 1952	X											
Buffalo	600,000	X			July 1952	X											
Carle Place	7,500		X		Mar. 1952			X			X	0.11		X		Approved by Water District Board. No increase in tax rates	

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
NEW YORK—Continued																
Clinton	2,000			X	Mar. 1952		X									
Elmira	70,000	X			Apr. 1952		X									
Fulton	14,422	X			May 1952	X										
Gloversville	23,500		X		Apr. 1952			X		X		0.15		X		Approved by Board of Water Commissioners. No increase in tax rates
Hamburg	6,938			X	July 1952	X										Action postponed one year
Hoosick Falls	4,300	X			Feb. 1952	X										
Hudson	11,442	X			June 1952			X								Approved by Dept. of Public Works
Larchmont	6,330	X			July 1952	X										
Newburgh	32,000		X		May 1945	X			X			0.11			X	Study project financed by State Health Dept.
New Rochelle	59,725		X		Oct. 1951			X	X			0.11		X		Approved by private water board. Increased water tax
Bronxville	6,778		X													
Eastchester	14,405		X													
North Pelham	5,046		X													
Pelham	1,843		X													
Pelham Manor	5,306		X													
Tuckahoe	5,991		X													
Olean	23,000		X		Nov. 1951	X				X		0.09	X			
Penn Yan	11,174	X			Mar. 1952	X										
Poughkeepsie	50,000	X			Mar. 1952	X										
River Head	4,800	X			June 1952	X										
Rochester	256,000	X			June 1949	X										
Schenectady	112,000		X		June 1952	X				X		0.15	X			
Troy	71,000	X			June 1951	X										
Westfield	3,649		X		Feb. 1952		X		X			0.15		X		No increased water tax
Yonkers	153,000	X			Dec. 1951	X										
Totals		14	13	2		16	3	4	3	3	1		2	4	1	Approved: 1,290,884 In operation: 300,743

NORTH CAROLINA																
Charlotte	134,042		X		Apr. 1949	X				X		†			X	Financed by City Health Department
Morris Field			X													
Pineville			X													
Concord	16,486	X			Dec. 1951	X										
Dunn	6,316	X			Feb. 1952	X										
Fayettesville	34,715	X			Jan. 1952	X										
Greensboro	74,389	X			Nov. 1951	X										
Hickory	14,755	X			May 1952	X										
High Point	39,973	X			Nov. 1951	X										
Lenoir	45,953	X			June 1952	X										
Reidsville	11,708	X			Feb. 1952	X										
Roanoke Rapids	8,156	X			Dec. 1951	X										
Rockingham	3,356	X			Dec. 1951	X										
Rocky Mount	27,697	X			Nov. 1951	X										
Salisbury	20,102	X			June 1952	X										
Southern Pines	4,272	X			Nov. 1951	X										
Wilson	23,010	X			Jan. 1952	X										
Winston-Salem	87,811		X		Oct. 1951	X				X		†		X		
Totals		14	4	0		16	0	0	0	2	0		0	1	1	Approved: 330,888 In operation: 221,853
NORTH DAKOTA																
Dickinson	6,500	X			1951	X										
Fargo	35,000		X		June 1952	X				X		†	X			
Northwood	1,200		X		Sept. 1951	X			X			†	X			
Totals		1	2	0		3	0	0	1	1	0		2	0	0	Approved: 6,500 In operation: 36,200
OHIO																
Akron	280,150	X			Sept. 1951	X										
Avon Lake	2,274		X		†			†	†			†			†	
Canton	119,051		X		†			†	†			†			†	
Chillicothe	20,502	X			May 1952	X										
Cincinnati	510,924	X			Mar. 1952	X										
Cleveland	1,225,000	X			Apr. 1952	X										
Ironton	16,477	X			May 1952	X										
Lisbon	3,379		X		†			†	†			†			†	
Medina	5,322	X			Jan. 1952	X										
Middletown	34,410	X			Jan. 1952	X										
Oberlin	4,305	X			May 1952	X										
Portsmouth	37,178	X			June 1952	X										
Toledo	308,034	X			June 1952	X										
Wellsville	7,997	X			June 1952	X										
Westerville	3,654		X		June 1951	X			X			†	X			

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
OHIO—Continued																
Wooster	14,239	X			Jan. 1951	X										
Youngstown	171,159	X			Jan. 1952	X										
Totals		13	4	0		14	0	0	1	0	0		1	0	0	Approved: 2,635,697 In operation: 128,358
OKLAHOMA																
Bartlesville	19,228		X		May 1952	X				X		†	X			
Guthrie	10,113	X			April 1952	X										
Holdenville	6,192	X			June 1952	X										
Nowata	3,965		X		Aug. 1951	X			X			†	X			
Oklahoma City	243,504	X			Apr. 1952	X										
Totals		3	2	0		5	0	0	1	1	0		2	0	0	Approved: 259,809 In operation: 23,193
OREGON																
Astoria	12,331	X			†		X									
Bend	11,409			X	May 1952	X										City Council rescinded its original approval. May submit question to electorate.
Corvallis	16,207		X		June 1952		X			X		†			†	Approved by popular vote
Eugene	35,879	X			†	X										
Florence	1,026		X		June 1952	X			X			†			†	
Gearhart	568		X		July 1951	X			X			†			†	
Hillsboro	5,142	X			†			†								
Pendleton	12,291	X			July 1952	X										
Totals		4	3	1		5	2	0	2	1	0		0	0	0	Approved: 65,643 In operation: 17,801
PENNSYLVANIA																
Brackenridge	6,400	X			Mar. 1952			X								Approved by water authority
Brookville	4,397		X		Sept. 1951	X			X			†		X		
Easton	33,589		X		May 1952	X			X			†		X		
Ebensburg	3,719		X		Dec. 1951	X			X			†		X		

Ford City	5,795		X		June 1951	X			X			†		X		
Landisville	670	X			Mar. 1952			X								Approved by private water company
Philadelphia	1,931,334	X			†	X										
Ridgeway	6,253	X			Dec. 1951	X										
Wilkensburg	29,853	X			Jan. 1952			X								Approved by water authority
Totals		5	4	0		6	0	3	4	0	0		0	4	0	Approved: 1,974,510 In operation: 47,500
RHODE ISLAND																
Bristol	12,326		X		May 1952	X			X			†			X	
Barrington	8,246		X													
Warren	8,513		X													
Central Falls	23,550	X			June 1952	X										
Cumberland	12,842	X			May 1952	X										
Lincoln	11,270	X			May 1952	X										
Pawtucket	81,436	X			Apr. 1952	X										
Providence	248,674		X		July 1951	X				X		†	X			
Cranston	55,060		X													
Johnston	12,725		X													
No. Providence	13,927		X													
Smithfield	6,690		X													
Warwick	43,028		X													
Totals		4	9	0		6	0	0	1	1	0		1	0	1	Approved: 129,098 In operation: 409,189
SOUTH CAROLINA																
Batesburg	3,169	X			Jan. 1952	X										
Camden	6,986	X			Aug. 1951	X										
Clinton Cotton Mills	3,387	X			Jan. 1952			X								Approved by mill officials
Fort Mill	3,204		X		May 1951	X				X		0.085		X		No increase in water tax
Greenville	58,161	X			July 1952		X									
Greenwood	13,806	X			Feb. 1952	X										
Hartsville	5,658		X		Oct. 1951	X			X			0.09		X		No increase in water tax
Lancaster	7,159	X			May 1951	X										
Ninety Six	1,556		X		Aug. 1950	X			X			0.105		X		No increase in water tax
Orangeburg	15,322	X			Oct. 1951	X										
Rock Hill	24,502		X		May 1952	X				X		0.082		X		No increase in water tax
Spartanburg	36,795	X			July 1952		X									
Totals		8	4	0		9	2	1	2	2	0		0	4	0	Approved: 144,785 In operation: 34,920
SOUTH DAKOTA																
Aberdeen	21,051		X		Apr. 1952	X				X		†	X			
Mobridge	3,753		X		Mar. 1952	X			X			†	X			
Rapid City	25,310	X			Apr. 1951		X									

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
SOUTH DAKOTA—Continued																
Vermillion	5,337	X			Apr. 1951		X									
Watertown	12,699	X			Apr. 1952	X										
Totals		3	2	0		3	2	0	1	1	0		2	0	0	Approved: 43,346 In operation: 24,804
TENNESSEE																
Bristol	16,721	X			Dec. 1951	X										
Brownsville	4,668		X		May 1951	X				X		†		X		No increase in water rates
Chattanooga	130,333	X			June 1952	X										
East Brainerd	12,000	X														
East Ridge	9,900	X														
Hixon	6,724	X														
Lookout Mountain	1,700	X														
Signal Mountain	1,783	X														
Cleveland	12,445		X		Mar. 1952	X				X		†		X		No increase in water rates
Germantown	397		X		Apr. 1952	X					X	†		X		No increase in water rates
Memphis	394,025			X	May 1952			X								Project opposed by utility board
Milan	4,940		X		Mar. 1951	X			X			†		X		No increase in water rates
Nashville	173,359	X			Feb. 1952	X										
Belle Meade	2,827	X														
Woodbine	2,000	X														
Paris	8,818	X			Mar. 1952	X										
Tiptonville	1,954	X			Mar. 1952	X										
Totals		12	4	1		9	0	1	1	2	1		0	4	0	Approved: 368,119 In operation: 22,450
TEXAS																
Austin	131,964	X			1950	X										
Breckenridge	6,605		X		Apr. 1951	X			X			0.1125		X		No increase in water rates
Corpus Christi	108,053		X		Mar. 1949	X			X			0.104		X		
Fort Worth	277,047	X			May 1952	X										
Graham	6,756		X		May 1951	X			X			†			†	

Iowa Park	2,115		X		1951	X			X			0.05		X		
Marshall	22,255		X		May 1946	X			X			0.09		X		No increase in water rates
Paris	21,636	X			Feb. 1952	X										
Sweetwater	13,580		X		Oct. 1951	X			X			†			†	
Temple	24,970		X		1951	X			X			0.10	X			
Tyler	38,864		X		May 1952	X			X			0.144		X		
Wellington	3,669		X		Sept. 1951	X					X	0.018	X			
Wichita Falls	67,709		X		July 1951	X			X			0.095		X		No increase in water rates
Totals		3	10	0		13	0	0	9	0	1		2	6	0	Approved: 430,647 In operation: 294,576
VERMONT																
Burlington	27,686		X		May 1952	X			X			0.11	X			
Montpelier	8,006			X	Apr. 1952		X									
Newport	4,902	X			†	X										
Rutland	17,082	X			†	X										
Springfield	5,882		X		May 1952		X		X			0.16		X		
Windsor	4,500			X	Mar. 1952		X									
Totals		2	2	2		3	3	0	2	0	0		1	1	0	Approved: 21,984 In operation: 33,568
VIRGINIA																
Alexandria	40,000	X			Nov. 1951	X										
Blackstone	3,500	X			Feb. 1952	X										
Charlottesville	20,000		X		Nov. 1951	X				X		†	X			
Danville	35,000			X	Apr. 1952	X										Action tabled by City Council
Fredericksburg	15,000	X			Apr. 1952	X										
Fries	2,000	X			Mar. 1952	X										
Lynchburg	50,000		X		Sept. 1951	X				X		†	X			
Norfolk	65,000	X			Feb. 1952	X										
Petersburg	35,000	X			Mar. 1952	X										
Richmond	200,000	X			Apr. 1952	X										
Totals		7	2	1		10	0	0	0	2	0		2	0	0	Approved: 360,500 In operation: 70,000
WASHINGTON																
Chehalis	5,639	X			†	X										Delayed by court injunction
Clarkston	5,617		X		Feb. 1952	X			X			†		X		Cost included in new rate by private company
Kennewick	10,085		X		Dec. 1950	X			X			†		X		
Kirkwood	4,713	X			Sept. 1951	X										
Longview	20,339	X			†	X										Implementation postponed for further study
Norwood Village	150		X		Feb. 1952		X		X				X			
Port Angeles	11,233			X	†	-	X									Informative vote of people; not binding on City Council

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
WASHINGTON—Continued																
Seattle	470,000			X	Mar. 1952		X									Previously approved by City Council
Totals		3	3	2		5	3	0	3	0	0		1	2	0	Approved: 30,691 In operation: 15,852
WEST VIRGINIA																
Belle	5,000	X			1951	X										
Charleston	73,501	X			1951	X										
Dunbar	8,032	X			1951	X										
Huntington	86,353	X			1952	X										
Hurricane	1,463	X			1951	X										
Logan	5,079	X			1952	X										
Nitro	3,314	X			1951	X										
Ripley	1,813		X		Apr. 1951	X			X			0.054	X			
St. Albans	9,870	X			1951	X										
So. Charleston	16,686	X			1951	X										
Weirton	24,005		X		Apr. 1951	X				X		0.026	X			
Wellsburg	5,878	X			1952	X										
Wheeling	58,891		X		Oct. 1949	X				X		0.063	X			
Williamstown	3,837		X		July 1952	X			X			†	X			
Totals		10	4	0		14	0	0	2	2	0		4	0	0	Approved: 215,176 In operation: 88,546
WISCONSIN																
Alma	1,068		X		Mar. 1952	X			X			†	†			
Amery	1,625		X		Feb. 1952	X			X			†	†			
Antigo	9,902		X		June 1949	†			X			0.04	†			
Appleton	34,010		X		Oct. 1950	X				X		0.03	†			
Arcadia	1,949	X			†	†										
Argyle	735	X			†	†										
Ashland	10,640		X		Oct. 1949	†				‖		0.12	†			
Athens	823		X		Mar. 1951	X			X			0.06	†			
Balsam Lake	452	X			†	†										

Baraboo	7,264		X	May	1949	X				0.08	†	
Beaver Dam	11,867		X	Mar.	1951	X				0.05	†	
Belleville	735		X	Aug.	1951	X		X		0.06	†	
Beloit	29,590		X	Apr.	1949	X			X	0.07	†	
Berlin	4,693		X	Oct.	1951	X		X		†	†	
Blair	873		X	July	1951	X		X		†	†	
Bloomer	2,556		X	Aug.	1950	X		X		0.12	†	
Boscobel	2,347		X	Mar.	1952	X			X	†	†	
Brandon	708	X		Feb.	1952	X						
Cambridge	552		X	June	1951	X		X		†	†	
Cedar Grove	1,010		X	Feb.	1952	X		X		†	†	
Columbus	3,250		X	Aug.	1950	X				0.08	†	
Crestwood	400		X	Oct.	1950	†		X		†	†	
Cuba City	1,333	X		Oct.	1951	X						
Darlington	2,174	X		June	1952	X						
DeForest	598	X			†	X						
Delavan	4,007	X		June	1951	X						
Dodgeville	2,532	X		Apr.	1952	X						
Eagle River	1,469		X	June	1951	X			X	†	†	
Eau Claire	36,058		X	Jan.	1951	X		X		†	†	
Edgar	705		X	Nov.	1949	X		X		0.06	†	
Edgerton	3,507		X	Oct.	1950	X			X	0.06	†	
Elkhorn	2,935		X	Apr.	1948	X		X		†	†	
Ellsworth	1,475	X			†	†						
Elroy	1,654		X	July	1951	X			X	†	†	
Evansville	2,531		X	Mar.	1950	X				0.10	†	
Fennimore	1,696	X			†	†						
Fond du Lac	29,936		X	July	1950	X				0.06	†	
Fort Atkinson	6,280		X	Dec.	1949	X		X		0.15	†	
Galesville	1,193		X	Sept.	1951	X		X		†	†	
Glidden	1,150	X			†	†						
Hartford	4,549		X	Jan.	1950	X		X		0.10	†	
Hayward	1,577		X	June	1951	X			X	†	†	
Horicon	2,664		X	May	1952	X		X		†	†	
Hudson	3,435	X			†	†						
Hurley	3,034	X			†	†						
Janesville	24,899		X	Feb.	1949			X		0.15	†	
Johnson Creek	511	X		July	1949	*						
Kenosha	54,368	X			†	†						
Keshena	500	X			†	†						
La Crosse	47,535	X		Jan.	1952	X						
Lake Geneva	4,300		X	May	1951	X			X	†	†	
Lake Mills	2,516	X			†	†						
Lodi	1,416		X	Feb.	1952	X			X	†	†	
Madison	96,056		X	June	1948	†		†		†	†	

* Uses hydrofluoric acid

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status			Date of action	Method of action			Compound used			Cost per capita	How financed			Comments
		Approved	In operation	Unfavorable action		Local government	Electorate	Other	NaF	Na_2SiF_6	H_2SiF_6		General funds	Water revenue	Other	
WISCONSIN—Continued																
Manitowoc	27,598	X			†	†										
Marinette	14,178		X		Mar. 1951	X				X		†	†			
Marshfield	12,394		X		Oct. 1950	X				X		0.07	†			
Mayville	3,010		X		Sept. 1950	X			X			0.11	†			
Mazomanie	962		X		Sept. 1951	X			X			†	†			
Mellan	1,306	X			Apr. 1951	X										
Menasha	12,385		X		Aug. 1950	X				X		0.09	†			
Menomonee Falls	2,469		X		Sept. 1951	X					X	†	†			
Middleton	2,110		X		June 1950	X			X			0.18	†			
Milton	1,549	X			†	†										
Milwaukee	637,392	X			Jan. 1951	X										
Mineral Point	2,284	X			Apr. 1952	X										
Mount Horeb	1,716		X		Feb. 1952	X					X	†	†			
Mukwonago	1,207		X		May 1949	X			X			†	†			
Neenah	12,437		X		Mar. 1950	X				X		0.04	†			
Neillsville	2,663	X			†	†										
Neopit	1,257		X		Jan. 1951	†			X			†	†			
New Glarus	1,224		X		Feb. 1952	X			X			†	†			
New Richmond	2,886	X			†	†										
Oregon	1,341		X		Feb. 1950	X			X			0.07	†			
Orfordville	543		X		Sept. 1951	X					X	†	†			
Osceola	642	X			†	†										
Oshkosh	41,084		X		Jan. 1950	X				X		0.03	†			
Park Falls	2,924			X	Apr. 1952		X									
Phillips	1,775		X		Nov. 1950	X			X			†	†			
Platteville	5,751		X		Oct. 1951	X				X		†	†			
Plymouth	4,543			X	†		X									
Portage	7,334		X		Mar. 1951	X			X			0.22	†			
Port Edwards	1,336	X			†	†										
Port Washington	4,755		X		Sept. 1950	X				X		0.06	†			
Poynette	870	X			Apr. 1952	X										

Prairie du Sac	1,402		X		Oct. 1951	X					X	†	†				
Racine	71,193		X		Mar. 1950	X				X		0.05	†				
Reedsburg	4,072		X		Feb. 1950	X			X			0.10	†				
Rhinelander	8,774		X		May 1950	X					X	†	†				
Rice Lake	6,898		X		Jan. 1952	X			X			†	†				
Richland Center	4,608		X		Dec. 1949	X						0.12	†				
Ripon	5,619		X		June 1951	X						†	†				
Shawano	5,894			X	†		X										
Sheboygan	42,365		X		Feb. 1946	†			X			0.11	†				
Shell Lake	954		X		May 1952	X			X			†	†				
Soldiers Grove	781		X		Jan. 1950	X			X			0.05	†				
South Milwaukee	12,855		X		June 1952	X			X			†	†				
Sparta	5,893		X		Oct. 1951	X					X	†	†				
Spooner	2,597		X		May 1952	X					X	†	†				
Spring Green	1,064		X		Dec. 1951	X					X	†	†				
Spring Valley	973	X			†	†											
Stevens Point	16,564			X	Sept. 1950		X										Fluoridation discontinued
Stoughton	4,833		X		Sept. 1949	X						0.09	†				
Sun Prairie	2,263		X		Mar. 1950	X						†	†				
Tomahawk	3,534		X		June 1951	X					X	†	†				
Trempealeau	527	X			July 1952	X											
Verona	535	X			†	†											
Viroqua	3,795			X	Apr. 1952		X										
Waterford	1,100			X	†		X										
Watertown	12,417		X		Dec. 1950	X						†	†				
Waunakee	1,042		X		Apr. 1951	X						†	†				
Waupun	6,725		X		Nov. 1950	X			X			0.08	†				
Wausau	30,414	X			July 1952	X											
West Bend	6,849		X		Aug. 1950	X						0.08	†				
Westby	1,491		X		Feb. 1951	X			X			†	†				
West Salem	1,376	X			†	†											
Weyauwega	1,207	X			†	†											
Whitehall	1,379		X		June 1951	†			X			†	†				
Whitewater	5,101	X			†	†											
Wisconsin Rapids	13,496		X		Jan. 1951	X			X			0.08	†				
Wonewoc	793	X			†	†											
Totals		37	78	6		84	6	0	37	26	13		0	0	0		Approved: 850,160 In operation: 695,970
WYOMING																	
Laramie	15,581		X		May 1952	X				X		†			X		
Sheridan	11,500		X		May 1952	X			X			†			X		
Sinclair	775		X		Jan. 1952	X				X		†			X		Financed by Sinclair Refinery
Totals		0	3	0		3	0	0	1	2	0		0	0	3		In operation: 27,856

Table 3 • Facts regarding fluoridation programs in the United States, its territories and possessions, August 1952—Continued

State and community	Population served	Present status: Approved	Present status: In operation	Present status: Unfavorable action	Date of action	Method of action: Local government	Method of action: Electorate	Method of action: Other	Compound used: NaF	Compound used: Na_2SiF_6	Compound used: H_2SiF_6	Cost per capita	How financed: General funds	How financed: Water revenue	How financed: Other	Comments
DISTRICT OF COLUMBIA																
Washington	1,000,000		X		June 1952	X				X		0.095	X			No increase in water rates
(Supplying water to nearby Arlington and Fairfax counties, Virginia)																
Totals		0	1	0		1	0	0	0	1	0		1	0	0	In operation: 1,000,000
ALASKA																
Anchorage	11,060	X			1951	X										
Totals		1	0	0		1	0	0	0	0	0		0	0	0	Approved: 11,060
PANAMA CANAL ZONE	52,822		X		Feb. 1952	X				†	-	†		†		
Totals		0	1	0		1	0	0	0	0	0		0	0	0	In operation: 52,822
PUERTO RICO	928,337	X			1952	X										
Totals		1	0	0		1	0	0	0	0	0		0	0	0	Six year plan for 76 municipalities Approved: 928,337

*Communities whose names are indented are supplied from community listed above.

†Information not reported.

‡Approved by water company and board of health. Indiana Public Service Commission granted rate increase with fluoridation as one of the requirements.

§Voted at town meeting.

‖Community started project with sodium fluoride; changed to sodium silicofluoride.

BUREAU OF LIBRARY AND INDEXING SERVICE

The American Dental Association Film Library

The American Dental Association Film Library has been focusing attention on increasing its collection of technical and dental health films. Prior to the purchase of any of these films, they are previewed by a review committee consisting of general practitioners, specialists in the field covered by the film, and dental health educators.

Two of the films reviewed in this article, produced by the University of Minnesota School of Dentistry in 1952, were shown on the motion picture program of the annual session of the Association in September 1952. Both of these films, "Correction of Deformity of Jaws" and "Bone Graft and Plating of the Mandible," have magnetic sound tracks. Magnetic sound is a comparatively new feature. This year 16 mm. magnetic sound recording projectors have been introduced into the audio-visual market. The films with magnetic sound now being circulated by the film library must be projected on a 16 mm. magnetic projector in order that the sound track may be heard. It can be projected on the regular 16 mm. sound projector; but if this is done, the audience views it as a silent film.

MAGNETIC SOUND

Magnetic sound has many advantages. Films can be narrated in foreign languages and organized in various ways for various groups. If a society or study club decides to purchase a silent print on a dental subject and would like to make its own magnetic sound track, it can be done in the following manner: A single perforated film, which is technically referred to as "sound stock," is striped with magnetic iron oxide on one edge. (Silent films have perforations on both sides.) The optical track is then projected by the committee responsible for adding the magnetic sound. During this showing, the members of this committee make notes and proceed to write the narration to correspond with the visual images according to frames. (There are 24 frames per second for sound films.) After the script has been edited, the magnetic sound may be recorded. Whoever is designated as narrator stands near the magnetic recording projector holding the microphone in his hand. As the film with its optical and magnetic sound track is run through the magnetic projector, he follows the visual image on the screen, narrating into the microphone as it proceeds. Through this process his narration is recorded and the film acquires magnetic sound. If, however, when the narrator views the film again, he discovers that certain phrases need revision, these can be erased by re-recording over the old track and substituting his corrections. The procedure is similar to that done on a tape recorder.

There also are disadvantages to magnetic sound. Films with magnetic sound tracks can be heard only if projected on magnetic sound projectors. These projectors are still very new and consequently the prices are high. In order to counteract this, some manufacturers are now developing equipment which will convert the regular 16 mm. sound projectors into magnetic sound projectors and this will be less expensive.

For information regarding source of purchase or for further details, please write to the A.D.A. Film Library.

FILM REVIEWS

Correction of Deformity of Jaws • 16 mm., color, with magnetic sound, 650 feet, showing time 20 minutes. Produced in 1952 by the University of Minnesota School of Dentistry. Surgery by Dan E. Brannin, D.D.S., M.S.D., and Henry B. Clark, Jr., M.D., D.D.S. Photography by James H. Rothenberger. Procurable on loan ($2.50) from the A.D.A. Film Library, 222 E. Superior St., Chicago 11, Ill., and on loan or purchase from the University of Minnesota School of Dentistry, Minneapolis.

This film shows the surgical and prosthetic steps involved in the correction of gross deformity of jaws and malocclusion in a 20 year old girl. Study models and cephalometric roentgenograms indicate retrusion and retraction of the mandible. Step I: upper right posterior teeth are removed and the lower teeth are ground to improve occlusion; Step II: first stage of osteotomy (Dingman's procedure); Step III: splint cemented to lower teeth; Step IV: second stage of osteotomy, performed two weeks later. Teeth are wired in new occlusion, bony fragments are secured and the wound is closed. The left side is managed in a similar manner. A pressure bandage is applied. Partial dentures are then constructed. The film concludes with photographs showing the patient's jaw before and after treatment. Considerable improvement is noticed. Since the film is well organized and presented, it can be an excellent teaching aid. The photography is very good. Good lighting enables the viewer to see all closeups clearly. It is suitable for dental students, practicing dentists, oral surgeons and orthodontists.

Bone Graft and Plating of Mandible • 16 mm., with magnetic sound, color, 550 feet, showing time 17 minutes. Produced in 1952 by the University of Minnesota School of Dentistry. Surgery by Dan E. Brannin, D.D.S., M.S.D., and Charles L. Wilkinson, D.D.S., M.S.D. Photography by James H. Rothenberger. Procurable on loan ($2.50) from the A.D.A. Film Library, 222 E. Superior St., Chicago 11, Ill., and on loan or purchase from the University of Minnesota School of Dentistry, Minneapolis.

This film demonstrates how old bilateral mandibular fractures with nonunion are corrected by open reduction, débridement, insertion of bone grafts and application of bone plates. The removal of the bone from the iliac crest of the patient was done by Leonard F. Peltier, M.D., University of Minnesota Hospital, Division of Orthopedic Surgery. The patient is seen before and after surgical correction. Preoperative and postoperative roentgenograms and photographs are used for comparison. This film is well presented and the photography is good. All intraoral shots are clearly visible. The method of introducing roentgenograms and photographs for comparison purposes makes this film an excellent teaching aid. It is suitable for dental students, practicing dentists and oral surgeons.

Partial Dentures—Biomechanics • 16 mm., color, sound, 736 feet, showing time 20 minutes. Produced in 1950 by the Dental Corps of the U.S. Bureau of Medicine and Surgery, Department of the Navy. Procurable on loan ($2.50) from the A.D.A. Film Library, 222 E. Superior St., Chicago 11, Ill., and from the Department of the Navy, Bureau of Medicine and Surgery, Dental Corps, Washington 25, D.C. Purchase ($73.21) from the United World Films, Castle Film Division, 1445 Park Ave., New York.

This film shows the influence of the forces of mastication on the design of partial dentures. By animation and diagrams, the various movements involved in mastication are clearly demonstrated. Important details of construction of partial dentures such as bracing, supporting and retaining are emphasized. It shows how lingual bars insure rigidity and how the abutment teeth determine the kind of clasp to be used. It also demonstrates the effect of incorrect design on surrounding oral tissues, explaining why it is incorrect. The film concludes with a summary. Its brevity and clear presentation make it an excellent film for teaching as well as for inclusion in programs on dentures, anatomy or physical sciences. It is suitable for dental and medical students and practicing dentists.

COUNCIL ON DENTAL RESEARCH

List of certified dental materials revised to September 1, 1952

Because there has been some confusion regarding certified dental materials, the Council on Dental Research presents this summary to clarify the operation of its certification plan.

The first fundamental item in this plan is the existence of official American Dental Association Specifications for Dental Materials. These specifications are the outcome of research by the American Dental Association Research Fellowship at the National Bureau of Standards correlated with the clinical experience of members of the Association.

As the second step in the operation of the plan, the manufacturers are invited to certify to the Council on Dental Research that their products comply with the specifications. It would be manifestly impossible for the Council (through the American Dental Association Research Fellowship at the National Bureau of Standards) to test every lot of every certified material. For this reason, the Council has required that the manufacturer, on certifying a product, not only must guarantee that this product meets specification requirements but also must furnish evidence that he maintains a testing program adequate to insure continual compliance of the product.

On receipt of a certification for a new product with all required data, the Council procures a random sample through regular trade channels, usually by asking a dentist to act as its agent. This sample is tested for compliance with all specification requirements. Only when the certification is complete and in proper form and the sample has passed all specification tests does the Council accept the manufacturer's certification. The name of the product is then added to the list of certified dental materials.

This, however, is not the complete story. The continuation of any product on the list of certified dental materials is contingent on its maintenance at specification quality. Surveys of all products on the list are made by the American Dental Association Research Fellowship at the Council's direction. These surveys are made on samples procured on the open market. Whenever a material fails to comply with the specification requirements, it is removed from the list and the manufacturer is notified that his certification of the product is no longer acceptable. Thus, although the Council cannot test the entire production of dental materials, its certification plan calls for continuous testing by the manufacturer and check tests by the Fellowship so that a constantly high level of quality of the products on the list will be maintained. Revisions of the list appear in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION from time to time.

Lately there have appeared through the mail some advertisements for amalgam alloys, mercuries, zinc phosphate cements and acrylic resins with statements that the manufacturer guarantees them to comply with the specifications of the American Dental Association. An examination of the list of certified dental materials shows that some of the materials that have been so advertised have not been certified by their manufacturers to the Council on Dental Research. The certification program is financed jointly by federal and American Dental Association funds, and no charge whatsoever is made to the manufacturer. If a manu-

facturer is regularly testing his material, then the only expense he will have in certifying the material to the Council is the cost of the three cent stamp required for mailing the certificate and data. When a dentist sees a statement such as, "Every batch of this alloy is carefully tested before being released for shipment to be sure that it fully meets A.D.A. specifications," he should be certain to check the list of certified dental materials to see if the product appears there.

In the purchase of certified material for use in dental practice, this list should be used as a buyer's guide. In addition, the package of material received should be checked for its exact name as given in the list and for a statement thereon guaranteeing compliance with the specification. The Council should be notified of any discrepancies.

CERTIFIED AMALGAM ALLOYS (A.D.A. SPECIFICATION NO. 1)

Alloy	*Manufacturer or Distributor*
Accurate Metalloy (filings)	The L. D. Caulk Co.
Argentum "A" cut; fine cut; medium cut; shavings	Hammond Dental Mfg. Co.
Aristaloy	Baker & Co., Inc.
Banner (filings)	Goldsmith Bros. Smelting & Refining Co.
Brewster Medium	Brewster Laboratories
Certified	Lee S. Smith & Son Mfg. Co.
Cresilver	Crescent Dental Mfg. Co
Dee (filings)	Kerr Mfg. Co.
Diamond Edge	Young-Baker & Co.
Excel	Daniels Dental Alloy Co.
Fellowship; New Fellowship	Dental Protective Supply Co.
Fleck's	Mizzy, Inc.
Garfield's	Garfield Smelting & Refining Co.
Gold Bond	Jefferson Dental Supply Co.
Lustraloy Regular; Cut T	Pfingst & Co.
Minimax (filings) 173; 177; 178; 178 fine cut; 183; White Gold & Platinum; (shavings) 177; 178	The Minimax Co.
Mission No. 5; No. 5 "A" Cut; No. 6	Henry F. Bruce Co.
Modeloy (quick setting filings)	Crescent Dental Mfg. Co.
Mynol Improved	Mynol Chemical Co.
National Dental	Eskay Dental Products
New Deal	Miller Dental Co.
Odontographic "Improved" (filings)	Odontographic Mfg. Co.
Pearlol	Wildberg Bros. Smelting & Refining Co.
Precision	Precision Bur Co.
Research Oralloy	Precious Metals Research Works, Inc.
Royal Super First Setting	Garhart Dental Specialty Co.
Safco 69	Safco Laboratories
Silver Crown Fast; Medium; Slow; Non Zinc	General Refineries, Inc.
Silverloy (filings); (shavings)	Crescent Dental Mfg. Co.
Speyer	Speyer Smelting & Refining Co.
S-C Medium (filings)	Stratford-Cookson Co.
S-R	Lee S. Smith & Son Mfg. Co.
Standard	Standard Dental Products Co.
Stratco	Edward P. Stratt
True Dentalloy (filings); (cut "A")	The S. S. White Dental Mfg. Co.
Twentieth Century Regular; Special; Fine cut alloy	The L. D. Caulk Co.
Uniform	Philadelphia Dental Supply Co.
Ultra Brand	H. Jelinek
Vertex	Vertex Dental Products Co.

White Beauty	Lang Dental Mfg. Co.
Yates Balanced	I. Miller, Inc.

CERTIFIED INLAY CASTING INVESTMENTS (A.D.A. SPECIFICATION NO. 2)

Investment	*Manufacturer or Distributo*
Beauty-Cast	Whip-Mix Corp., Inc.
Kerr Cristobalite-Inlay	Kerr Mfg. Co.
Ransom and Randolph Gray	The Ransom & Randolph Co.
Security Improved Inlay	The Cleveland Dental Mfg. Co.
Steele's-Super	The Ransom & Randolph Co.

CERTIFIED IMPRESSION COMPOUNDS (A.D.A. SPECIFICATION NO. 3)

Compound	*Type*	*Manufacturer or Distributor*
Certified	I	Lee S. Smith & Son Mfg. Co.
Dresch	I	The Ransom & Randolph Co.
Exact	I	The S. S. White Dental Mfg. Co.
Kerr Perfection; No. 2 Soft Green; Gray; White	I	Kerr Mfg. Co.
Mizzy—Low Heat	I	Mizzy, Inc.
S. S. White—Black—Tray	II	The S. S. White Dental Mfg. Co.

CERTIFIED INLAY CASTING WAXES (A.D.A. SPECIFICATION NO. 4)

Wax	*Manufacturer or Distributor*
Baker-Blue—regular medium	Baker & Co., Inc.
Caulk-Blue	The L. D. Caulk Co.
Kerr-Blue—Hard	Kerr Mfg. Co.
Security	The Cleveland Dental Mfg. Co.
Taggart's-Blue	Mizzy, Inc.

CERTIFIED INLAY CASTING ALLOYS (A.D.A. SPECIFICATION NO. 5)

TYPE A, SOFT

Alloy	*Manufacturer or Distributor*
Aderer-A-Soft	Julius Aderer, Inc.
Baker Inlay Soft	Baker & Co., Inc.
Bruce "A"	Henry F. Bruce Co.
Chilcast No. 1	Vernon-Benshoff Co.
Coe 1	Coe Laboratories, Inc.
Crown Inlay No. 2 Soft; K	General Refineries, Inc.
Deeone	Dee Division of Handy & Harman
GB Inlay No. 1 Soft	Goldsmith Bros. Smelting & Refining Co.
Jelenko Special Inlay	J. F. Jelenko & Co., Inc.
Krause Soft Inlay	Krause Gold Refinery
Light Inlay	Benjamin R. Leff
Luft "A"	John Luft Prescription Alloys
Mowrey's S-1	W. E. Mowrey Co.
Ney-Oro A; AA	The J. M. Ney Co.
Research A	Precious Metals Research Works, Inc.
Spyco Soft; Eleven	Spyco Smelting & Refining Co.
S. S. White No. 2; 900 Soft; 940 Very Soft	The S. S. White Dental Mfg. Co.
Stern S	I. Stern & Co., Inc.
Wildberg A-2	Wildberg Bros. Smelting & Refining Co.
Wilkinson 2S	Wilkinson Co.
Williams Inlay 3; Will-Cast 22	The Williams Gold Refining Co., Inc.

TYPE B, MEDIUM

Alloy	*Manufacturer or Distributor*
Aderer-B-Medium	Julius Aderer, Inc.
Aleco No. 1; No. 2	A. L. Engelhardt Co.
Baker Inlay Medium	Baker & Co., Inc.
Bruce "O"	Henry F. Bruce Co.
Chilcast M; 1M; 2M	Vernon-Benshoff Co.
Coe 2	Coe Laboratories, Inc.
Crown Inlay No. 1 Hard; Knapp No. 2; T	General Refineries, Inc.
Deetwo	Dee Division of Handy & Harman
GB Inlay No. 2 Medium Hard	Goldsmith Bros. Smelting & Refining Co.
Jelenko Modulay; Platincast	J. F. Jelenko & Co., Inc.
Krause Hard Inlay	Krause Gold Refinery
Luft "B"	John Luft Prescription Alloys
Medium Soft	Benjamin R. Leff
Mowrey's B-Inlay	W. E. Mowrey Co.
Ney-Oro A-1; A-10	The J. M. Ney Co.
Spyco Inlay; Medium; Tinker one	Spyco Smelting & Refining Co.
S. S. White No. 1; No. 5; No. 820	The S. S. White Dental Mfg. Co.
Stern 1; No. 3290	I. Stern & Co., Inc.
Wildberg "A"; C-2	Wildberg Bros. Smelting & Refining Co.
Wilkinson 8M	Wilkinson Co.
Williams Pioneer; Special Inlay; One "Inlay"	The Williams Gold Refining Co., Inc.

TYPE C, HARD

Alloy	*Manufacturer or Distributor*
Aderer-C-Hard; "Dressel"	Julius Aderer, Inc.
Aleco No. 4	A. L. Engelhardt Co.
Baker Hard Inlay	Baker & Co., Inc.
Bruce No. 5	Henry F. Bruce Co.
C Gold	Benjamin R. Leff
Chilcast No. 2; No. 2-H	Vernon-Benshoff Co.
Coe 3	Coe Laboratories, Inc.
Crown No. 9; Kapp No. 3; Supreme Inlay; TT	General Refineries, Inc.
Deesix	Dee Division of Handy & Harman
GB Inlay No. 3 Hard	Goldsmith Bros. Smelting & Refining Co.
Jelenko Durocast; Firmilay	J. F. Jelenko & Co., Inc.
Luft "C"	John Luft Prescription Alloys
Mowrey's S-3	W. E. Mowrey Co.
Ney-Oro B; B-2; BW	The J. M. Ney Co.
Research No. 5; "Inlay"	Precious Metals Research Works, Inc.
Spyco No. One-H; Six; Tinker Two; Hard	Spyco Smelting & Refining Co.
S. S. White No. 8; No. 13; 860 Hard	The S. S. White Dental Mfg. Co.
Stern 2; 3337; 3465; H	I. Stern & Co., Inc.
Wildberg "C"; B	Wildberg Bros. Smelting & Refining Co.
Williams Klondiker; Special "Four"	The Williams Gold Refining Co., Inc.

CERTIFIED DENTAL MERCURIES (A.D.A. SPECIFICATION NO. 6)

Mercury	*Manufacturer or Distributor*
Argentum	Hammond Dental Mfg. Co.
Ballard's	Quicksilver Producers Association
Certified	Lee S. Smith & Son Mfg. Co.
Chemically Pure	The S. S. White Dental Mfg. Co.
C. P. Mercury	Goldsmith Bros. Smelting & Refining Co.
Crown	General Refineries, Inc.

Dee	Dee Division of Handy & Harman
Dental	Drug Laboratories, Inc.
Dental, C. P.	F. W. Berk & Co., Inc.
Fellowship	Dental Protective Supply Co.
Garfield's	Garfield Smelting & Refining Co.
Garhart's Positively Pure	Garhart Dental Specialty Co.
Krause's Pure	Krause Gold Refineries
Mercury C. P.	Metalsalts Corp.
Mercury C. P.	Wildberg Bros. Smelting & Refining Co.
Mercury N.F. IX Redistilled	Mallinckrodt Chemical Works
Minimax	The Minimax Co.
Mission	Henry F. Bruce Co.
Mynol	Mynol Chemical Co.
Ney	The J. M. Ney Co.
Odontographic	Odontographic Mfg. Co.
Research	Precious Metals Research Works, Inc.
Spectropure	Baker & Co., Inc.
Twentieth Century	The L. D. Caulk Co.
Williams	The Williams Gold Refining Co., Inc. (Applies to Williams' one pound bottles only, as quarter pound containers are not glass.)

CERTIFIED WROUGHT GOLD WIRE ALLOYS (A.D.A. SPECIFICATION NO. 7)

Alloy	*Manufacturer or Distributor*
Aderer No. 1; No. 3; No. 4; No. 20 Clasp	Julius Aderer, Inc.
Baker 21; Q. A.	Baker & Co., Inc.
Crown Hylastic	General Refineries, Inc.
Deepep-Hard	Dee Division of Handy & Harman
GB Extra High Fusing; Medium Fusing; Regular High Fusing	Goldsmith Bros. Smelting & Refining Co.
Jelenko No. 3 Wire; Super Wire	J. F. Jelenko & Co., Inc.
Ney-Oro Elastic No. 4; Neydium 9	The J. M. Ney Co.
Spyco No. 2; No. 4	Spyco Smelting & Refining Co.
S. S. White No. 12; No. 61 Metalba	The S. S. White Dental Mfg. Co.
Stern No. 2657	I. Stern and Co., Inc.
Williams No. 1 Super; No. 2 High Fusing Clasp; No. 3 High Tensile	The Williams Gold Refining Co., Inc.
Vernon-Benshoff Clasp Wire No. 6	Vernon-Benshoff Co.

CERTIFIED ZINC PHOSPHATE CEMENTS (A.D.A. SPECIFICATION NO. 8, FIRST REVISION)

Cement	*Manufacturer or Distributor*
Ames Z-M	The W. V-B Ames Co.
Bosworth's Zinc	Harry J. Bosworth Co.
Caulk Crown and Bridge; Petroid Improved; Tenacin	The L. D. Caulk Co.
Certicem	Lee S. Smith & Son Mfg. Co.
Fleck's Extraordinary	Mizzy, Inc.
Lang Crown Bridge and Inlay	Lang Dental Mfg. Co.
S-C	Stratford-Cookson Co.
Smith's	Lee S. Smith & Son Mfg. Co.
S. S. White Silver Improved; Zinc; Zinc Improved	The S. S. White Dental Mfg. Co.

CERTIFIED SILICATE CEMENTS (A.D.A. SPECIFICATION NO. 9)

Cement	*Manufacturer or Distributor*
Ames Plastic Porcelain	The W. V-B Ames Co.
Astralit	Premier Dental Products Co.

Baker Plastic Porcelain	Baker & Co., Inc.
Diafil	Pfingst & Co., Inc.
DeTrey's Synthetic Porcelain	The L. D. Caulk Co.
Durodent Enamel	Oskar Schaefer
Smith's Certified Enamel Improved	Lee S. Smith & Son Mfg. Co.
S. S. White Filling Porcelain Improved	The S. S. White Dental Mfg. Co.

CERTIFIED HYDROCOLLOIDAL IMPRESSION MATERIALS—AGAR TYPE (A.D.A. SPECIFICATION NO. 11)

Material	*Manufacturer or Distributor*
Coe-Loid 66	Coe Laboratories, Inc.
Deelastic	Kerr Mfg. Co.
Dentocoll	The L. D. Caulk Co.
Elastic Colloid	The S. S. White Dental Mfg. Co.
Kerr Hydro-Colloid	Kerr Mfg. Co.
Perfectocoll	Baker & Co., Inc.
Plasticoll	Lee S. Smith & Son Mfg. Co.
Surgident	Surgident, Ltd.

CERTIFIED DENTURE RESINS (A.D.A. SPECIFICATION NO. 12)

Material	*Form*	*Manufacturer or Distributor*
Acralite	Clear; pink; powder-liquid	Acralite Co., Inc.
Ac-Ril	Pink; powder-liquid	Ac-Ril Dental Corporation
Acri-Lux	Pink; powder-liquid	Acri-Lux Dental Mfg. Co.
Acrylic A Pink	Pink; powder-liquid	Austenal Laboratories, Inc.
Acrylic A Mottled	Pink; powder-liquid	
Acrylic A Orange Pink	Pink; powder-liquid	
B-B	Clear; pink; powder-liquid	Bell Dental Products Co.
Certified	Clear; pink; powder-liquid	Lee S. Smith & Son Mfg. Co.
Coe Acrylic	Pink; powder-liquid	Coe Laboratories, Inc.
Coralite	Pink; powder-liquid	Coralite Dental Products Co.
Crystolex, Regular	Pink; powder-liquid	Kerr Mfg. Co.
Crystolex, Form 102	Pink; powder-liquid	
Densene 33	Clear; pink; powder-liquid	Cosmos Dental Products Inc.
Denture Acrylic	Clear; pink; powder-liquid	The S. S. White Dental Mfg. Co.
Enciton	Pink; powder-liquid	The L. D. Caulk Co.
Hygienic	Pink; powder-liquid	The Hygienic Dental Rubber Co.
Improved Justi-Tone T-3; Justi-Tone	Pink; powder-liquid	H. D. Justi & Son, Inc.
	Pink; powder-liquid	
Lang's	Pink; powder-liquid	Lang Dental Mfg. Co.
Loktone	Clear; pink; powder-liquid	Myerson Tooth Corporation
Lucitone	Clear; pink; plastic cake	The L. D. Caulk Co.
	Clear; pink; powder-liquid	
Luxene 44	Pink; plastic cake	Luxene, Inc.
Marvel	Pink; powder-liquid	Marvel Dental Products Co.
Miracryl	Pink; powder-liquid	The Motloid Co., Inc.
Opalex "45"	Pink; powder-liquid	The Opalex Co.
Oryl Brand	Pink; powder-liquid	The Wm. Getz Corporation
Palatex	Pink; powder-liquid	Rockland Dental Co., Inc.
Perma Cryl	Pink; powder-liquid	Acri-Lux Dental Mfg. Co.
Premier	Clear; pink; powder-liquid	Premier Dental Products Co.
Standard Brand	Pink; powder-liquid	Ray Foster Dental Supplies
Vernonite	Clear; pink; plastic cake	Vernon-Benshoff Co.
	Pink; powder-liquid	
Vitacrilic D, L	Pink; powder-liquid	Fricke Dental Mfg. Co.
Vita-Lite	Clear; pink; powder-liquid	Vita-Lite Products Co.
Vitalon	Pink; powder-liquid	Austenal Laboratories, Inc.

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THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Editorials

Subsidies, logic, aspirin and democracy

An item of less than considerable interest appeared in a recent issue of a dental publication[1] which is apparently the subsidized house organ of a commercial concern. The item decries the danger of subsidies to the dental and medical schools of the United States by the federal government.

Apparently this editor believes that a subsidy is O.K. when used to put a professional veneer over what is really a commercial sales effort, but that subsidy is attended by all of the horrors of socialism in quotation marks if used to increase the facilities of the nation for training much needed health personnel. Such thinking (to use the word loosely for the moment) is equivalent to getting a headache from worrying about the dangers of aspirin and then taking a tablet to stop the pain. No one denies the right of this editor to think as loosely as he likes and, incidentally, the article itself proves that no one has denied him this right. He does not have the right, however, to point a finger at anyone in regard to subsidies unless he is double-jointed enough to point the same digit at himself at the same time. This we would like to see.

The subtle and dangerous thing about such writing is not its logic for that is easily recognized as being merely fuzzy. The subtle and dangerous thing could be the effort to initiate a witch-hunt by loud shouting about a type of "democracy" which just happens to be individual to the author.

This writer's concept of "democracy" is well-illustrated from his own article. First, he pins a tag—"leftists"—on those whose job it is to present to appropriate agencies the considered opinions of the democratically elected House of Delegates of the American Dental Association. Second, he scorns the real democratic process of governing by majority rule the instant that majority rule runs counter to his own

prejudices. Third, he applauds as "democratic" the veto by a small body of an opinion supported by 75 per cent of the members of one group and 100 per cent of the members of another. From this it is obvious that his logic is matched only by his concept of "democracy." While this type of writing could be dangerous, reasonable people will recognize such efforts for what they are: the whimpering cries of one who must have attention to pay the bills and to survive.

This is one time this old, attention-getting device has worked. In order that the most be made of this small success, permission is hereby granted to the magazine in question to reprint this editorial in full without regard to copyright. In addition, one copy of this issue of THE JOURNAL will be furnished without charge so that the editor may show it to his sponsors who can then determine how successfully their subsidy is being applied to the causes of the dental profession and, indeed, to the promotion of real democracy and understanding.

1. Editorial, D. Items Interest 74:676 (July) 1952.

New disability insurance of the Association unmatched for cost or quality

Every member of the dental profession recognizes the desirability of protecting his family against the hazards of illness and accident. Every member of the Association can now provide his dependents with such protection through a group health and accident insurance program approved by the Association last March and announced to members on the first of last September.

In addition to the safety measures of this program and to the fact that it provides immediate assistance in times of need, it has three outstanding features: low cost and—provided 50 per cent of the Association's members apply during the 90 day charter enrollment period—waiver of medical examinations and insurance coverage of impaired as well as unimpaired risks.

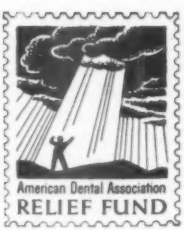
This health and accident insurance program is a new venture on the part of the Association; one undertaken at the urgent request of many dentists. Its success will depend entirely on the manner in which it is accepted by members. The key to its success is this: at least one half the total members of the Association must agree to accept the policy before the insurance will become effective for those dentists who ordinarily would be classified as poor insurance risks. Originally it was anticipated that a short sixty day charter enrollment period would be sufficient to enroll 50 per cent of Association members. Because time moves more rapidly than men, however, this ideal has not been reached; therefore applications will be accepted provided they are postmarked not later than November 30, 1952.

The policy defines total disability as the inability to practice dentistry because of illness or accident. Totally disabled policyholders receive monthly benefits up to $400 for as long as 60 months following an accident and for as long as 24 months during an illness. The annual premium rates, which vary according to age and

extent of coverage, are from 35 per cent to 50 per cent less than the rates charged for individual policies. All members of the Association less than 65 years of age are eligible, and once an applicant is accepted, his policy cannot be terminated because of age or recurrent disability. It can be terminated only by nonpayment of the premium, by retirement from the dental profession, or by failure to retain membership in the Association.

This health and accident program does not conflict with similar programs made available by constituent and component societies. Where insurance is already in force, the American Dental Association program will be merely a supplement to existing protection. Members of the Association who have not attained their sixty-fifth birthday and who have not sent in their application during this charter enrollment period are urgently invited to do so. In the event that 50 per cent of the membership does not subscribe, those members who are unfortunate enough to be physically impaired will suffer the further misfortune of not being able to secure one of these low cost policies. In a group program of this type the size of each policy does not matter—the number of policies do. If you are undecided as to the amount of insurance presently needed, order a small policy. You can add to it later. The main thing is to help your family, yourself and your fellow practitioner by becoming a charter member of the plan. To do that you must act now.

"You gave me peace of mind"



Again the season of the year has arrived when those who have, customarily aid those who have not. In the dental profession this object is accomplished through the Relief Fund of the American Dental Association. By early November each member of the Association[1] will have received a packet of Relief Seals, a folder entitled "You Gave Me Peace of Mind" which describes the operation and benefits of the Relief Fund program and an invitation to participate. Read the folder. See what has happened to others who once were prosperous, productive dentists. Recall the words attributed to John Bradford, "There, but for the grace of God, go I." Then give—and give generously.

This year, as in the past four years, the goal for Relief Fund contributions has been set at a modest $100,000. Although this sum averages less than $1.50 per member, it has never yet been reached. Last year the total contributions, the highest in history, fell short of the mark by $6,000—an average of ten cents per member. Last year one half of the constituent societies, the greatest number in history, reached or passed, their quotas. It is hoped that this year each contributor will increase his contribution by at least ten cents—or better still by ten per cent—and that all constituent societies will join the full quota column so that the $100,000 goal will be reached.

In a large organization such as this Association it is seldom that the individual member can do much to aid a needy fellow practitioner. Rarely can he measure the

needs of his fellow members because he comes in contact with so few whose needs are great. The Relief Fund program is the Association's mechanism for helping the successful dentist do what he would like to do for those less fortunate practitioners whom he does not know—the needy practitioners who, living in other communities, he cannot know.

Until this year's Relief Fund Campaign is concluded, until every active member has contributed to the fullest extent of his ability and to the satisfaction of his own conscience, the project should be a major activity of the Association. Every dentist can help somewhat. Some can give more, some less, depending on individual circumstances. The main point is to give and give so generously that this year's goal of $100,000 will be overcontributed.

The Relief Fund of the Association long since has become an institution. For almost a half century the relief seal campaign launched each November has been linked fittingly with Thanksgiving. Enjoy your holiday; and as you give thanks for your own security, contribute liberally to the Relief Fund, to your own satisfaction, and to the peace of mind of distressed fellow dentists.

1. Page 600 of this issue.

A joint statement on recent advertisement of a chlorophyll-containing dentifrice

An advertisement for Chlorodent dentifrice appeared in the newspapers October 15, on a nation-wide scale. The advertisement featured the results of a study at Boys Town of the gingival effects of a dentifrice which includes a derivative of chlorophyll. The advertisement stated that the study had been described in an article published in the *Journal of Periodontology*. Actually, the study had not been published at the time the advertisement was released to the public. Consequently, dentists had not had an opportunity to read and evaluate the article and thereby be in a position to provide suitable answers to the many patients who made inquiries concerning the validity of the advertising claims.

In view of these facts, the following statement has been issued jointly by Thomas J. Hill, Cleveland, chairman of the Council on Dental Therapeutics of the American Dental Association, and Maynard K. Hine, Indianapolis, editor of the *Journal of Periodontology:*

"It is extremely unfortunate that the distributor of a commercial product has acted in a fashion contrary to the public interest. The Chlorodent advertisement erred in representing that the gingivitis study had been published. In so doing, it implied that the public could anticipate a reasonable explanation of this matter from the normal source of such information—the dental profession.

"The investigators, the institution at which the study was made and the *Journal of Periodontology* were not at fault in this matter since every effort was made to carry out a sound and logical investigation and to publish the results in conformity with accepted scientific practice.

"The manuscript had been previously submitted to the Council on Dental Therapeutics of the American Dental Association for its information. It should be emphasized that the overly optimistic claims in the advertisement for the usefulness of Chlorodent were not in conformity with the careful and moderate statements in the manuscript.

"Several important differences are presented here in brief so that the profession may be prepared, in some measure, to provide explanatory information to patients.

"After only two months the percentage of improved cases was significantly higher in the group using the 'chlorophyllin' pastes than in the control group. At the end of nine months, however, the boys in the experimental group and those in the control group had benefited to about the same degree.

"The study was carried out under supervision that included toothbrushing instruction and checks of regularity of brushing, which is in keeping with good control in scientific investigations. Whether similar results may be obtained under ordinary conditions of use in the home has yet to be proved.

"An increase in the severity of gingivitis was also noted in some cases, presumably as a result of the irritant effect of calculus.

"Several important facts which the general reader will not discern from the advertisement are emphasized in the following quotation from the manuscript:

> The dramatic improvement in gingivitis observed in this study is undoubtedly related to the initially high incidence of gingivitis in these children. It would be important also to determine the effects of toothbrushing with a dentifrice containing chlorophyllin in a low gingivitis group. Similarly, it will be important to determine the effects of toothbrushing and the effects of chlorophyllins in adults since the character of the gingivitis tends to change with age.

"The advertising program may mislead the consumer into the belief that by the use of Chlorodent toothpaste, professional attention to gingival disorders may be postponed or obviated. It would seem important, therefore, for dentists to inform their patients that while proper toothbrushing is important in the maintenance of oral hygiene, it is not a substitute for professional treatment."

Washington News Letter

An invaluable fund of information on dental education in this country has just been published. "Financial Status and Needs of Dental Schools," which made its first appearance late in October, represents a cooperative effort made by the Council on Dental Education of the American Dental Association and the U. S. Public Health Service.

The 90-page volume's practical importance is considerable, not merely as a useful reference work but as an indispensable aid to Congress in its consideration next year of federal financial assistance to schools of dentistry, medicine and nursing. In this regard, the survey report—though it meticulously refrains from any advocacy of governmental aid—discloses that dental schools need 43 million dollars for physical expansion and an additional 11 million dollars for new equipment and strengthening of teaching staffs.

Launched early in 1951, the survey had a five-member advisory group whose first chairman was J. Ben Robinson. In September, 1951, Gerald D. Timmons succeeded him in the chairmanship. Other members were Otto W. Brandhorst, Maynard K. Hine and Robert W. McNulty. Dr. Robinson served as consultant to the survey staff for the duration of the study. The research staff was under the direction of Walter J. Pelton, chief of the dental resources division in USPHS, and G. St. J. Perrott, chief of public health methods in the office of the Surgeon General.

Leonard A. Scheele, Surgeon General of the USPHS, expressed confidence that the report will provide "important information on the nature and magnitude of many of the problems facing dental education today." He acknowledged the wholehearted cooperation received from deans, faculties and finance officers who gave unstintingly of their time and effort in compiling data and answering field workers' questions.

The year studied was 1949-50. The survey covered 40 dental schools, situated in 23 states; the schools surveyed had been in operation for four or more academic years. Undergraduate enrollment totaled 11,359. All but three of the institutions were integrated with universities, and the 15 schools under public control accounted for 35 per cent of aggregate enrollment. Faculty members totaled 3,430, two thirds of whom served on a part-time basis.

Following are some of the survey's findings:

Total amount spent for basic operations in 1949-50 was 15.7 million dollars, of which 69 per cent was for direct expenses of the schools and the remainder for indirect costs of administration, libraries and maintenance.

Major sources of income were tuition, state and city appropriations, university transfers and income from clinics. Only relatively small sums were realized from endowment income, gifts and grants. Roughly one third of all revenues came from fees and tuition, a like amount from transfers and appropriations, one fourth from clinic services and the remainder from gifts, grants, endowments and miscellaneous sources.

"One of the striking financial characteristics of dental education," says the report, "is the importance of income from dental clinics. For all schools combined, receipts from dental clinics totaled 3.9 million dollars. The distribution of dental clinic income by geographic region indicates that these funds were not concentrated in any one region but played an important part in financing dental schools throughout the Nation."

The report also presents financial data on the 18 schools of dental hygiene that were in operation in 1949-50, with a total enrollment of 1,180. Twelve were associated with dental schools, two were units in detached dental dispensaries, three were in institutes of applied arts and sciences and one was in a state teachers' college.

PRESIDENT'S COMMISSION

Financing of health services was the theme of the final public hearing conducted by the President's Commission on the Health Needs of the Nation, which was held in Washington, October 7-8. Inadvertently an invitation to the American Dental Association to present facts and opinions on cost factors was extended too late for a complete statement to be submitted.

C. Willard Camalier, assistant secretary, appeared before the Commission and said, in part:

"It is my opinion that emphasis should be placed upon the value of dental service to the individual and its relation to his health, rather than solely upon the economic consideration involved. It also should be observed that payments for dentistry are not comparable

to payments insofar as medicine is concerned, and that an opportunity should be provided by the Commission to discuss these economics with qualified persons in the profession. I am sure that the Association will be pleased to give you its views in writing when it has been so requested."

ARMED FORCES NEWS

The Department of Defense is working on its requirements for dental officers for the first quarter of 1953 and some inkling of its plans will be divulged shortly when Selective Service is called upon to furnish a quota for January. For December, the call-up figure is 204, which brings to 1,254 the total of dentists called by Selective Service since July, 1951.

Officials, however, were in doubt whether monthly quotas for the final quarter of 1952 could be met, in view of delays attending final processing of Priority III registrants by local draft boards. It was the delay in giving physical examinations that resulted in the sending of induction orders to dentists over 35 years of age. Had Selective Service not canceled these orders, a considerable number of older men would have been placed on active duty, contrary to the letter and spirit of Public Law 779 and Selective Service regulations, which provide that dentists in Priority III shall be called up in "youngest first" order.

Maj. Gen. Walter D. Love, chief of the Army Dental Corps, reports that the service is saving $500,000 a year by substitution of a chrome-cobalt alloy for gold in manufacture of partial dentures and dental replacements at five central laboratories. The substitute is cheaper, sturdier and lighter, besides being easier to clean, according to General Love.

Until a sufficient number of dental technicians is trained in the manufacture of chrome-cobalt dentures, production will be limited to the central laboratories at Walter Reed Army Medical Center in Washington; Brooke Medical Center in Texas; Letterman Hospital in San Francisco; Army Medical Depot in St. Louis, and the military hospital at Fort McPherson, Ga.

SURVEY OF CARIES RESEARCH

The latest publication of the National Research Council is "Survey of the Literature of Dental Caries," a cloth-bound volume of 568 pages which was prepared for the Food and Nutrition Board of the National Research Council under the supervision of the Board's dental health committee.

Chapters on experimental caries in animals, oral environment and caries, and fluorine and caries were written by Gerald J. Cox. A section on prevention of caries is by Sidney B. Finn. Charles F. Bodecker composed a chapter on pathology of caries, and James H. Shaw wrote one on nutritional factors. The introductory review is by Guttorm Toverud and the foreword by A. LeRoy Johnson.

Financial assistance by certain corporations and trade groups permits the sale of the book at $3. Orders should be sent to Publications Office, National Research Council, 2101 Constitution Avenue, Washington, D.C.

Otto W. Brandhorst (above), President
Leslie M. FitzGerald (left), President-elect
Newly-elected officers (opposite page)

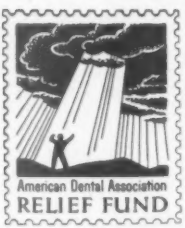
Otto W. Brandhorst (center, left), dean of Washington University School of Dentistry, St. Louis, assumed the presidency of the American Dental Association on September 11, 1952. Dr. Brandhorst, an orthodontist, is well known as a teacher, administrator, editor and essayist. He is a past president of the St. Louis Dental Society and the Missouri State Dental Association, former editor of the Journal of the Missouri State Dental Association and a former director of the American Association of Orthodontists. He has been secretary of the American College of Dentists since 1935 and was secretary of the American Association of Dental Editors for 15 years. Dr. Brandhorst was born in Nashville, Ill., on March 29, 1889, and was graduated from Washington University School of Dentistry in 1915, the year in which he joined the school's faculty. He has been an active member of the American Dental Association for many years, serving repeatedly as a member of the House of Delegates, consultant to the Council on Dental Health and member of the Council on Dental Education, representing the American Association of Dental Schools. He was chairman of three committees of the Council on Dental Education: the committees on dental aptitude testing, on the training of dental hygienists and on inspection forms. In 1935 he served on the Dental Advisory Council to the Committee on Economic Security, and in 1945 he was consultant on dental study for the Bureau of Research and Statistics, Social Security Board.

Leslie M. FitzGerald (far left), oral surgeon of Dubuque, Iowa, was elected president-elect of the Association at its recent annual session in St. Louis. Dr. FitzGerald has practiced his specialty in Dubuque for the last 32 years and has served as president of the Iowa Dental Society, the American Society of Oral Surgeons and the Dubuque Dental Society. He is a co-founder, diplomate and secretary of the American Board of Oral Surgery; since 1945, he has been chairman of the committee on oral surgery of the American College of Dentists. Dr. FitzGerald has been a member of the editorial board of the Journal of Oral Surgery since 1950, chairman of the advisory committee to the Bureau of Economic Research and Statistics for several years and previously, a member of the committee on economics for 14 years. He has served as a member of the House of Delegates since 1929, as chairman of the Section on Oral Surgery and as a member of the Council on Dental Education's committee on internships and residencies. He has been appointed chief of the oral surgery staffs at three hospitals in Dubuque, Iowa.

Newly-elected officers and trustees of the Association are shown at the close of the recent annual session, after the Hawaii Territorial Dental Society had presented leis to four officers. Seated (l. to r.) are: H. B. Washburn, treasurer; Otto W. Brandhorst, president; Leslie M. FitzGerald, president-elect; Harold Hillenbrand, secretary, and Harry Lyons, speaker of the House. Standing (l. to r.) are: Lewis W. Thom, A. F. Schopper, Earl G. Jones and Charles I. Taggart, trustees; Henry F. Westhoff, first vice-president; Fritz A. Pierson, second vice-president, and John A. O'Keefe, third vice-president.

Association Affairs

RELIEF FUND DRIVE OPENS: $100,000 GOAL SET



The annual appeal for contributions to the Relief Fund of the American Dental Association has been opened with the distribution of Relief Fund Seals to all members of the dental profession in the United States. The Relief Fund, a charitable trust supported by voluntary contributions of dentists, provides assistance to those members of the dental profession who, through accident or illness, are totally unable to help themselves.

The campaign goal is $100,000 again this year, and individual quotas have been set for the 54 constituent societies, it has been announced by the Council on Relief. Last year more than $94,200 was contributed and 31 constituent societies and the Air Force reached or exceeded their respective quotas.

The Council expressed confidence that this year the Relief Fund would reach its $100,000 goal for the first time in its history. "I am confident that the mounting appeals for aid from the Relief Fund will find a wholehearted response from every more fortunate member of the dental profession," said Leo W. Kremer of Chicago, chairman of the Council on Relief.

As contributions are sent to the Central Office, each will be recorded and credited to the state from which it originated. As in former years, net contributions will be divided equally between the Association's Relief Fund and the Fund of the contributor's state society. The Association Relief Fund pays one half of each relief grant and the Fund of the state concerned pays the other half of each grant.

Contributions should be sent to the American Dental Association Relief Fund, 222 East Superior Street, Chicago 11.

MEMBERSHIP OF COMMITTEE ON ORAL SURGERY ANNOUNCED

The Association's "special committee on problems in the field of oral surgery," which was authorized by the House of Delegates at the recent annual session, will be composed of the following men appointed by President Brandhorst, who will serve as chairman:

Leslie M. FitzGerald, president-elect, American Dental Association, ex officio
James Cameron, American Board of Oral Surgery
Sanford Moose, American Society of Oral Surgeons
Harry Lyons, American Association of Dental Schools
William Hodgkin, American Association of Dental Examiners
Bert L. Hooper, Council on Dental Education, American Dental Association
Frank Hower, Council on Hospital Dental Service, American Dental Association
Philip Blackerby, Advisory Committee on Dental Specialties
Philip M. Northrop, representative of regional oral surgery society
F. A. Pierson, representative of private general practice

The first meeting of the special committee will be held during the latter part of November in the Central Office.

DENTAL TEACHERS COMPOSE NATIONAL BOARD TESTS

The December examinations of the National Board of Dental Examiners are being constructed by subcommittees of faculty members from dental schools throughout the country, it has been announced by the Council of the National Board of Dental Examiners.

Each of the 12 tests to be given December 1-2 is being constructed by a team of men who have specialized in the field assigned to them. They are attempting to make all test items objective, rather than essay-type questions, as reports and records will be available more quickly when the tests can be marked by machine, according to Gordon L. Teall of Hiawatha, Kan., chairman of the Council. "The large number now taking the examinations makes it impractical, even impossible, to mark essay-type questions," he said.

This program for constructing tests is a new one, the Council stated, and more subcommittee members will be appointed as the program continues; more schools will also be represented, on the basis of wide geographical distribution. Under the new program, Council members and consultants who formerly constructed the tests will be chairmen of the 12 subcommittees.

Leslie M. FitzGerald (left), president-elect of the Association, congratulates Gerald Halker, president of the student Association at Loyola University dental school, New Orleans, on the school's 100 per cent enrollment in the Association.

National Defense

ARMY NAMES NEW ASSISTANT TO DENTAL DIVISION CHIEF

The former dental surgeon of the Fifth Army has been assigned to the post of assistant to the chief of the Army Dental Service, Office of the Surgeon General in Washington, D. C. He is Brig. Gen. Egbert W. Cowan, DC, USA, who assumed his new duties several weeks ago; he succeeds Brig. Gen. Neal A. Harper, who has retired.

Successor to General Cowan at Fifth Army Headquarters, Chicago, will be Col. S. R. Haven, presently post dental surgeon at Fort Dix, N. J.

INDUCTION OF PRIORITY III DENTISTS OVER 36 POSTPONED

Priority III dentists between 36 and 45 years of age were granted a reprieve from induction into the Armed Forces in October, as a result of protests lodged with several federal agencies by the American Dental Association.

After the Association had reported that some dentists in the older age group were receiving orders to report for immediate induction, Selective Service officials on October 7 issued a directive to local draft boards advising that Priority III dentists who were 36 years old by

Brig. Gen. Egbert W. Cowan (left) is shown after the presentation of his Brigadier General's star by Lieut. Gen. William B. Kean (right), commanding general of the Fifth Army, Chicago. General Cowan was dental surgeon of the Fifth Army until his recent promotion and appointment as assistant to the chief of the Army Dental Service, Office of the Surgeon General, Washington.

October 1 are not to be called until the younger registrants have been processed.

Induction of men in the older age group would have violated the spirit of regulations which provide that Priority III registrants (dentists under 51 years of age with no military experience since September 1940) are to be called in order of age, starting with the youngest. Recent dental school graduates with no military experience are included in the younger age group of Priority III registrants.

Officials of the Selective Service System state that local draft boards had called dentists in the older age group because the incomplete classification of Priority III registrants had culled too few dentists who could be classified as "acceptable."

The Association has urged that all remaining Priority III registrants be classified as rapidly as possible, to make available a greater number of the younger Priority III dentists.

Estimates of Priority III Strength • Meanwhile, figures on the status of dentists in Priority III were released to the Association's Council on Legislation. They indicate that 14,700 dentists have registered in Priority III under Public Law 779, and that 3,500 of them are 35 years of age or younger.

As of August 31, the disposition of Priority III's, in approximate numbers, was as follows: 5,500 not classified; 7,500 awaiting physical examination; 100 on active duty; 43 commissioned; 550 classified as essential; 232 deferred for other reasons; 150 physically disqualified, and 600 no longer subject to the draft, having reached the age of 51.

Military Requirements to June, 1953 • The total military requirements for the months October-June inclusive have been announced as 2,806 dentists. The three armed services issued the following combined monthly requirements: October, 154; November, 216; December, 216; January, 393; February, 764; March, 306; April, 229; May, 163; June, 365.

Dentists inducted during the coming months will replace those now on duty who will be released from service. July 1, 1953, is the present expiration date of Public Law 779, which authorizes the induction of dentists and physicians.

Vulnerability to Call of Priority III Dentists • The requirements of the Armed Forces for dental officers to July, 1953, will be met in part from reclassification of Priority I and Priority II dentists who have been deferred. The balance will be drawn from Priority III.

In a memorandum to trustees of the Association, officers of state societies, deans of dental schools and other interested persons, the secretary of the Association on October 8 summarized the vulnerability of Priority III dentists:

As a result of recent activity in classifying all dentists in Priority III, there has been undue concern among dentists over 45 about the possibility of imminent induction. On the basis of present information, there is little likelihood that any in this age group will be called before July 1, 1953 when Public Law 779 expires. Persons in this age group who do not desire a commission should be advised to indicate on their Department of Defense questionnaires (D.D. Form 390) that they do not desire a commission now.

It does not seem likely at this time that dentists in the 40 to 45 age group will be in immediate danger of induction once all of the dentists in Priority III have been classified. Until such classification is completed, they may be somewhat more vulnerable since deficits in a draft call must be made up out of available dentists in Priority III.

It is anticipated that there will be a relatively heavy call on dentists between 35 and 40 following January 1, 1953, and dentists in that age group may be informed that vulnerability will increase after the first of the year.

It is anticipated that there will be immediate calls for dentists in Priority III under the age of 35, and many of these calls will be received before the end of 1952.

Revision of Recruitment Procedures • On October 20, military officials and representatives of professional organizations met in Washington to discuss present procedures used in calling up Priority III dentists.

R. H. Friedrich of Plainfield, N. J., chairman of the Council on Federal Dental Services, and Francis J. Garvey, secretary of the Council on Legislation, attended the meeting.

Representatives of the Association will also meet with the American Medical Association's Council on National Emergency Medical Services November 8, to discuss the possible revision of present recruitment procedures.

DENTAL LEADERS TO ADDRESS MILITARY SURGEONS' MEETING

A symposium on Reserve affairs—commissions, active duty requirements and retirement benefits—will be presented for Reserve dental officers now on active duty, during the 59th annual meeting of the Association of Military Surgeons, to be held November 17-19 at the Statler Hotel, Washington, D.C.

Otto W. Brandhorst of St. Louis, president of the American Dental Association, and Brig. Gen. Oscar P. Snyder, director of dental activities at the Walter Reed Army Medical Center, will appear as featured speakers at the three-day conference. Maj. Gen. Harry G. Armstrong, Surgeon General of the Army, will preside. Point credits toward retirement will be given all eligible Reserve officers in attendance.

SELECTIVE SERVICE TO CALL 204 DENTISTS IN DECEMBER

The December Selective Service call will include 204 dentists, of whom 159 will be assigned to the Army and 45 will go into the Air Force, it was announced recently by the Defense Department. Presumably Priority III registrants will fill the new call, which will bring the number of dentists inducted since July, 1951, to 1,254.

Dental Societies

GREATER NEW YORK MEETING TO BE HELD DECEMBER 8-12

A symposium on ammoniated and chlorophyll dentifrices and a report from the president of the American Dental Association will highlight the Greater New York Dental Meeting, to be held December 8-12 at the Hotel Statler, New York.

The twenty-eighth meeting under the auspices of the First and Second District Dental Societies of the State of New York will include five days of color television clinics, registered clinics, visual education programs, table clinics, topic discussions and general sessions.

Otto W. Brandhorst, president of the American Dental Association, will address the first general session December 8, on "Dentistry Today." Other speakers on the program will be Alex N. Lifschutz of Brooklyn, president of the Second District Dental Society, and Willard S. Bell of Ozone Park, N. Y., president of the Dental Society of the State of New York.

Further information may be obtained from Mabel Purdy, executive secretary, Greater New York Dental Meeting, Hotel Statler, New York 1.

NEW MEXICO DENTAL JOURNAL RESUMES PUBLICATION

After a lapse of two years, the *New Mexico State Dental Journal* has resumed publication as the official quarterly periodical of the New Mexico State Dental Society. It will be managed by a committee consisting of Elbert W. King of Albuquerque, editor; John E. Eilar III and Willie B. May of Albuquerque; DeForest D. Lord, Jr., of Santa Fe, and Royal B. Parish of Hobbs. Dr. Eilar is business manager.

Public Health

PUBLIC HEALTH AWARD GIVEN H. T. DEAN, F. S. McKAY

H. Trendley Dean of Washington, D.C., and Frederick S. McKay of Colorado Springs, Colo., were recently named co-winners of a Lasker Foundation award by the American Public Health Association. They received the $1,000 award for their research on the dental benefits of fluoridated water; they are the first dentists to receive a Lasker prize.

Dr. Dean is director of the National Institute of Dental Research; Dr. McKay is the pioneer investigator of the effects of fluoride in water. The awards were presented formally on October 21 at the eightieth annual meeting of the American Public Health Association.

A.P.H.A. GIVES FIVE SESSIONS TO PUBLIC HEALTH DENTISTS

"It is highly unlikely, if tooth decay continues at its present rate, that the average child will ever get all of the dental care he should have," George E. Waterman, assistant chief of the USPHS Division of Dental Public Health, stated at the eightieth annual meeting of the American Public Health Association, which was held in Cleveland October 20-24.

Dr. Waterman reported on the 1946-52 pilot study, "The School Dental Care Program of Richmond, Indiana," a clinical care program which was conducted by the USPHS, the Indiana State Department of Health and the Richmond municipal school system.

During the five-day A.P.H.A. meeting, the dental health section met for three separate sessions and two combined sessions under the chairmanship of Thomas W. Clune of Providence, R. I.

Two eminent dental researchers, co-winners of the Lasker Foundation Award of the American Public Health Association, participated in a combined session called "Interpreting the Water Fluoridation Program to the Community." Frederick S. McKay and H. Trendley Dean pleaded for greater distribution of research findings to combat misunderstanding.

Suggestions for a pre-fluoridation survey and for the effective use of such baseline surveys in community dental program planning were offered by Norman F. Gerrie, USPHS officer of Denver. Charles L. Howell of Indianapolis spoke on the effect of topically applied stannous fluoride on dental caries experience.

The dental health section's final program featured the following papers: "Ad-

ministrative Position of Dental Units in State Health Departments," W. Philip Phair of Chicago; "Rehabilitation of the Dental Physically Handicapped Child," David B. Ast of Albany, N. Y.; "Epidemiological Principles Applied to Dento-Facial Deformities," Walter J. Pelton of Washington, D. C., and "The Joseph Samuels Dental Clinic Program," Alfred F. Morin of Providence, R. I.

Two dentists who addressed school health sections of the A.P.H.A. were: Lester A. Gerlach of Milwaukee and Henry C. Sandler of Brooklyn. The annual luncheon session of the dental health section was held October 22 and featured an address by Harold Hillenbrand, secretary, American Dental Association.

USPHS NAMES DENTAL CHIEF OF NEW CLINICAL CENTER

Ralph Spurr Lloyd, previously chief dental officer at the Public Health Service hospital in Baltimore, has been appointed chief dental officer of the Public Health Service's new 500-bed clinical center for research at Bethesda, Md. This center will be associated with the National Institute of Dental Research. Dr. Lloyd is a graduate of Western Reserve Dental School, and took postgraduate work in maxillofacial prosthesis at Memorial Hospital in New York.

OHIO TEACHERS, PARENTS GET BOOKLETS ON DENTAL CARE

A syllabus on teaching dental health has been distributed to teachers in Ohio's public and parochial schools, and a pamphlet on children's dental health will be distributed to parents and lay groups, it has been announced by the Ohio Department of Health.

Both the syllabus and the pamphlet were developed at the recent third Work Conference sponsored by the Division of Dental Hygiene of the Ohio Department of Health, and the Council on Dental Health of the Ohio State Dental Association, cooperating with the Ohio Department of Education.

The Work Conference patterned the brochure on a Toledo Dental Society pamphlet and the syllabus on a Cleveland Dental Society publication.

AMERICAN LEGION ASKS POSTS TO SUPPORT FLUORIDATION

Wording of the fluoridation endorsement passed by the American Legion at its 1952 annual convention is as follows:

WHEREAS, The fluoridation of municipal water supplies has, in tested areas, reduced dental caries in children by 60 to 65 per cent, and
WHEREAS, The addition of fluoride to water supplies has the endorsement of the American Medical Association, the American Dental Association, the United States Public Health Service, the State and Territorial Health Officers Association, and others,
NOW, THEREFORE, BE IT RESOLVED, That the American Legion recommends that Posts give careful consideration to the matter of fluoridation of water as a means of protecting the teeth of children.

SHANNON TO REPLACE TOPPING AT USPHS HEALTH INSTITUTES

Norman H. Topping, associate director of the National Institutes of Health and assistant Surgeon General of the USPHS, has resigned to become vice-president of the University of Pennsylvania in charge of medical affairs. James A. Shannon, former associate director of the National Heart Institute, has been appointed to succeed Dr. Topping.

NEW SPECIALTY BOARD LISTS NINE DIPLOMATES

The American Board of Dental Public Health has certified nine diplomates, as a result of the first certifying examination given by the Board in September.

The nine dentists, all engaged in public health work, are: John E. Chrietzberg of

Springfield, Ill.; H. Shirley Dwyer of Concord, N. H.; John T. Fulton of Washington, D.C.; Norman F. Gerrie of Denver; Thomas L. Hagan of Washington, D.C.; William P. Kroschel of Atlanta, Ga.; Frank E. Law of Boston; George A. Nevitt of Kansas City, Mo., and Carl L. Sebelius of Nashville, Tenn. Dr. Chrietzberg, Dr. Dwyer and Dr. Sebelius are employed by their state health departments, and the others are officers of the U.S. Public Health Service.

A second certifying examination will be given by the American Board of Dental Public Health next September in Cleveland. Candidates for examination under the waiver clause of the Board's Eligibility Requirements for Examination and Certification must submit their applications by January 1, 1953.

Information and application forms may be obtained from the secretary, Philip E. Blackerby, Jr., 250 Champion Street, Battle Creek, Mich.

Dental Education

SURVEY OF DENTAL SCHOOLS' FINANCES, FACULTY ISSUED

Dental schools in the United States need funds totaling 49 million dollars for construction and equipment and an increase in annual income of more than two million dollars for additional staff members.

These figures, reported in the newly-issued "Study of the Financial Status and Needs of Schools of Dentistry," were gathered during the 1951 survey of 40 dental schools which was conducted by the United States Public Health Service in cooperation with the Council on Dental Education of the American Dental Association.

The report shows that 37 of the 40 schools reported that construction or additional equipment was needed to maintain satisfactory standards of teaching; these schools estimated that a total of $49,300,000 was needed for physical expansion and equipment.

Adequate faculties were the other primary need of the schools during the study year of 1949-50. Nearly 500 full-time instructors—338 of them professional—were needed by the 40 schools; 88 part-time instructors were also needed. The annual cost of the additional faculty members was listed at $2,515,387.

In addition to data on unmet needs of the dental schools, the report included analyses of present income, expenses and faculty resources.

In 1949-50, about 35 per cent of dental schools' total income came from tuition, 35 per cent from state-city and university appropriations and 25 per cent from clinic charges. Gifts, grants and endowments account for only three per cent of the dental schools' total revenue, in contrast to medical schools' endowments which account for 21 per cent of their revenue.

Faculty members of the 40 dental schools numbered 3,430, of whom 708 were full-time instructors, 520 full-time in medical schools or other divisions of parent universities and 2,202 part-time in the dental school. About one third of total full-time and part-time faculties were 35 years of age or younger. Undergraduate enrollment numbered 11,359 students, of whom one third were enrolled in the 15 schools under public control.

The survey was conducted by a field staff of USPHS personnel under the direction of Walter J. Pelton and G. St. J. Perrott.

The survey's advisory committee was composed of five dental educators: J. Ben Robinson, dean of the University of

Maryland School of Dentistry; Otto W. Brandhorst, dean of Washington University School of Dentistry; Maynard K. Hine, dean of the University of Indiana School of Dentistry; Robert W. McNulty, dean of the University of Southern California School of Dentistry, and Gerald D. Timmons, dean of Temple University School of Dentistry. Dr. Robinson was the first chairman; Dr. Timmons became chairman when Dr. Robinson retired from the Council. Dr. Robinson was consultant to the USPHS staff throughout the survey.

As this was a fact-finding survey, no recommendations are included in the report.

F. C. ELLIOTT MADE DIRECTOR OF TEXAS MEDICAL CENTER

John V. Olson, professor of restorative dentistry at the University of Texas dental school, has been appointed vice-president and dean of the dental school, replacing Frederick C. Elliott, who resigned to become executive director of the Texas Medical Center, Houston, effective November 1.

F. C. Elliott

Dr. Elliott has been active in the Medical Center since 1946, when it was founded to "improve education in the healing arts and provide facilities for advanced research." Institutions affiliated with the Center include, in addition to the University of Texas Dental Branch, the Baylor University College of Medicine, University of Texas Postgraduate School of Medicine, University of Houston College of Nursing, eight hospitals and a medical library.

John V. Olson

Dr. Olson, the new dean, is 39 and a native of Michigan; he has Master of Science and Doctor of Dental Surgery degrees from the University of Michigan. Dr. Olson taught at his alma mater and St. Louis University before joining the University of Texas Dental Branch faculty in 1950.

KELLOGG FOUNDATION AWARDS $115,300 TO DENTAL SCHOOLS

Two grants for the improvement of dental education—$79,000 to the University of Michigan and $36,300 to the Medical College of Virginia—have been awarded by the W. K. Kellogg Foundation. Both grants are for three-year programs.

At the University of Michigan, the grant will be used to establish an experimental course for the training of dental teachers which will combine instruction in dentistry with instruction in the technics of teaching and the administration of educational programs. The course will become a part of the training program of those graduate dental students who are interested in teaching.

At the Medical College of Virginia, the grant will be used to develop a program of refresher courses for practicing

dentists. The Kellogg Foundation's series of grants for this purpose began in 1937 with the University of Michigan and was extended in 1947 and later years to eight other dental schools in the United States and two in Canada. Grants covering this phase of the Foundation's program now total $763,000.

W. J. SIMON OF MINNESOTA NAMED DENTAL DEAN AT IOWA

William J. Simon, professor of operative dentistry at the University of Minnesota School of Dentistry, will become dean of the College of Dentistry at the State University of Iowa on January 1. The present dean at Iowa, Alvin W. Bryan, will become dean emeritus and professor emeritus on that date.

Dr. Simon is a graduate of the University of Minnesota dental school and has been on the school's staff since 1936.

SOUTHERN CALIFORNIA OPENS NEW DENTAL SCHOOL CLINIC

The new clinic building of the School of Dentistry, University of Southern California, was dedicated October 24 in a day of ceremonies ending with a banquet address by Otto W. Brandhorst, president of the American Dental Association. Dr. Brandhorst, who is dean of the dental school at Washington University, St. Louis, delivered an address entitled "In My Time."

The new $1,215,000 dental building was the site of a clinic program presented during the afternoon by members of the dental school's graduate faculty and students.

At morning ceremonies, 10 commemorative bronze plaques honoring American dental leaders, were presented to the library. Among those represented on the plaques are W. I. Ferrier of Seattle; George Hollenback of Sherman Oaks, Calif.; Ernest Jones of Seattle, dean of the University of Washington dental school; B. B. McCollum of Los Angeles, and James Prime of Omaha. Also represented are five deceased dentists: Guy Baird of Los Angeles; Lewis E. Ford of Los Angeles, former dean of Southern California School of Dentistry; C. N. Johnson of Chicago; William H. Taggart of Chicago and Charles Woodbury of Shenandoah, Iowa.

GEORGETOWN DENTAL SCHOOL TO REQUIRE RESEARCH COURSE

Georgetown University School of Dentistry has inaugurated a program of dental research for its students. Each third-year student will select a topic of investigation and will devote approximately one year to this research project in addition to regular class and clinic duties.

A dissertation on the results of the investigation must be submitted by each student before completion of his senior year.

To aid the students with this project and to furnish them with an adequate background for the reading and understanding of research journals after graduation, the school has instituted a lecture course, "Principles and Methods of Scientific Research"; it is being taught by Bernard K. Forscher, a biochemist and coordinator of research for the dental school.

PENNSYLVANIA DENTAL SCHOOL TO OBSERVE DIAMOND JUBILEE

A committee under the chairmanship of LeRoy M. Ennis will plan the 1953 diamond jubilee celebration of the School of Dentistry, University of Pennsylvania, it has been announced by Lester W. Burket, dean of the School.

Dr. Ennis, professor of roentgenology and past president of the American Dental Association, has named a committee of 12 men to assist him in arranging

plans for the celebration this spring and summer. The committee members are: Harrison M. Berry, Jr., Paul E. Bomberger, Arthur E. Corby, Thomas P. Fox, Frederick H. Herbine, Z. T. Jackaway, Leon Levy, John P. Looby, Joseph V. Masino, Harry Mesjian, Charles L. Patton and Ned B. Williams.

The dental school was founded on March 6, 1878 and was the third university dental school in this country. A major reunion of graduates is being planned for the week June 8-13, when a week-long program of events will be presented.

TEMPLE UNIVERSITY TO OPEN FOURTH TELEPHONE SERIES

The fourth series of Temple University dental school's telephone extension programs will open November 10, with a program on exodontics.

Other subjects to be treated during the series include: dental materials and therapeutic aids in everyday dentistry, December 8; removable partial denture prosthesis, January 12; treatment of periodontal diseases, February 9, and developmental anomalies in dental practice, March 9, 1953.

Information may be obtained from Carl McMurray, Temple University School of Dentistry, Philadelphia 40.

WASHINGTON, D.C., HOSPITAL SEEKS DENTAL INTERNS

One-year dental internships at a salary of $2,500 are being offered at St. Elizabeths Hospital, Washington, D.C., by the United States Civil Service Commission.

The hospital is a large federal institution for the treatment of mental disorders; interns practice general dentistry under the supervision of the dentist in charge. Applicants should be citizens under 35 years of age and must be physically healthy. Preference will be given veterans, their widows, or the wives of disabled veterans.

An informational pamphlet (No. 252) and an application form (No. 57) may be obtained by writing to the Committee of U. S. Civil Service Examiners, St. Elizabeths Hospital, Washington, D.C.

DENTAL SCHOOLS ANNOUNCE NEW POSTGRADUATE COURSES

Illinois • Short postgraduate courses in anatomy, roentgenology and anesthetics will be offered this month at the University of Illinois College of Dentistry.

Harry Sicher of Loyola University School of Dentistry will teach "Anatomical Basis for Oral Diagnosis" on six Wednesday evenings beginning November 5.

W. W. Wainwright of the University of Illinois dental school will present, with his

The honorary degree of Fellow in Dental Surgery of the Royal College of Surgeons, England, was awarded to LeRoy M. Ennis (left), past president of the American Dental Association, during the recent International Dental Congress in London. Dr. Ennis is shown accepting his degree from Sir Cecil Wakeley, eminent British surgeon and president of the College.

staff, a course in "Roentgenologic Technic." This course will be given on six Wednesday evenings, also beginning November 5.

The course entitled "Trichlorethylene-Nitrous Oxide Anesthesia and Analgesia" will be offered 9 a.m.-5 p.m. from Monday, November 17, through Thursday, November 20. It will be taught by Max S. Sandove of the University of Illinois College of Medicine.

Registration may be made by writing to Isaac Schour, associate dean in charge of postgraduate studies, University of Illinois College of Dentistry, 808 South Wood Street, Chicago 12.

Washington (Seattle) • A three-course series in oral roentgenology will be presented during November by the University of Washington School of Dentistry, Seattle. Gordon M. Fitzgerald of the University of California dental school will be the instructor and will be assisted by Edward A. Bourassa of the University of Washington dental school.

Advanced oral roentgenology, to be presented from 9 A.M. to 5 P.M., November 10-11, is open only to registrants of Dr. Fitzgerald's previous postgraduate courses. Practical oral roentgenology, for the general practitioner, will be offered from 9 A.M. to 5 P.M., November 12-14. Fundamentals and technics in oral roentgenography, for dental hygienists and assistants, will be offered during the mornings of November 12-14 and all day November 15.

Application for admission may be made to the director of postgraduate dental education, School of Dentistry, University of Washington, Seattle 5.

JOHN OPPIE McCALL TO HEAD NEW ORGANIZATION SCHOOL

John Oppie McCall of New York was installed October 3 as director of New Organization School for Graduate Dentists, New York. Dr. McCall was formerly professor of periodontology at New York University's dental school and was director of the Murry and Leonie Guggenheim Dental Clinic.

International

BRITISH DENTAL ASSOCIATION ELECTS WELSH DENTIST

The new president of the British Dental Association is Clement G. Spiridion of Cardiff, South Wales, who was elected at the annual meeting of the B.D.A. in September.

In his presidential address, Mr. Spiridion stressed the need for more dentists in Great Britain and the need for routine dental treatment of patients in general hospitals. He cited statistics showing that in Great Britain and Northern Ireland there are "15,000 dentists for fifty million people, roughly one dentist to every 3,333 of the population." This compares with one dentist for every 1,777 of the population in the United States.

BALINT ORBAN AWARDED MILLER PRIZE BY F.D.I.

Balint Orban of Chicago and Colorado Springs was awarded the Miller prize of the Fédération Dentaire Internationale at the eleventh International Dental Congress in London recently. Dr. Orban is professor of periodontics at Loyola University (Chicago) School of Dentistry and is director of the Colorado Dental Foundation in Colorado Springs.

Other recipients of the prize were S. Palazzi of Milan, Italy, and A. E. Rowlett of Leicester, England. Charles Nord, president of the F.D.I., presented the citations and bronze medals which are given prize-winners.

ISRAELI DENTAL INSTITUTE OPENS POSTGRADUATE COURSES

The Israeli Dental Association has announced that on November 2 its B. Gottlieb Postgraduate and Research Institute in Tel Aviv will open its postgraduate dentistry program for the third year.

Courses will be offered one day each

week in the following subjects: full and partial dentures, crown and bridge, operative dentistry, endodontics, periodontics, roentgenology and oral surgery. The Research Institute will also cooperate with any registrants interested in conducting research projects.

General

RECORD ATTENDANCE REPORTED AT ORAL SURGEONS MEETING

The American Society of Oral Surgeons, at its meeting October 8-11 in New Orleans, installed D. C. McRimmon of Fort Worth, Texas, as president and elected D. H. Bellinger of Saginaw, Mich., president-elect. Stanley Rice of Beverly Hills, Calif., is the new vice-president, and C. V. Boyko of Paterson, N. J., the new Council member. Frank B. Hower of Louisville, Ky., was re-elected secretary-treasurer, and Ruth F. Whalen of Richmond, Va., was reappointed executive secretary.

Attendance at the meeting was estimated at 540 dentists, exceeding the registration of previous years. The Society will meet in Houston in October 1953.

RETIRED DENTAL EDUCATOR, TEXTBOOK AUTHOR, DIES

Charles E. Woodbury, eminent dental educator and professor emeritus at Creighton University dental school, died recently at the age of 87. Dr. Woodbury, who taught at Creighton from 1908 to 1949, was noted for his pioneering work in the use of gold foil; his book on technic was widely used as a text. He also designed many dental instruments which are now mass-produced and in general use. Dr. Woodbury was graduated from the University of Iowa dental school in 1886.

NEW ORLEANS CONFERENCE TO MEET NOVEMBER 9-12

Dentists of the Southern United States and Latin America will confer at the fifth annual New Orleans Dental Conference, to be held November 9-12 at the Roosevelt Hotel, New Orleans.

Leslie FitzGerald of Dubuque, Iowa, president-elect of the American Dental Association, will be one of the featured clinicians at the conference. Others are Vincent Trapozzano of New Port Richey, Fla.; Ralph L. Ireland of Lincoln, Neb.; Arthur J. Kershaw, Jr., of West Warwick, R. I.; Arvin W. Mann of Fort Lauderdale, Fla., and La Mar W. Harris of Chicago. Any member of the American Dental Association may attend.

Further information may be obtained from Prescott E. Smith, 922 National Bank of Commerce Building, New Orleans 12.

INDIANA DENTIST, 89, PLANS TO CONTINUE PRACTICE

An 89 year old dentist who practices in Bedford, Ind., has registered his claim to the title of "oldest practicing dentist in the United States." He is John G. Hogan, a graduate of Kansas City Dental School, who has been in private practice since 1886.

For 44 years, his office has been in the Citizens Trust Building in Bedford. An active participant in dental organizations for many years, Dr. Hogan is a life mem-

John G. Hogan

At its annual meeting September 7 in St. Louis, the American Society of Dentistry for Children presented honorary life memberships to Mrs. DeLos Hill of Atlanta, founder of the children's dental clinic at Emory University dental school, and Samuel D. Harris of Detroit, a founder of the Society. Shown at the presentation are (l. to r.) Frank F. Lamons of Atlanta, Mrs. Hill, Dr. Harris and Earl L. Lampshire of Lincoln, Neb., retiring president of the Society.

ber of the American Dental Association and a past president and trustee of the South Central Dental Society of Indiana.

"One of Dr. Hogan's contributions to dentistry was that of developing a method of baking root tips onto porcelain teeth used in fixed bridge work," reports a colleague of Dr. Hogan, R. E. Bobbitt of Bedford. "This idea was adopted by some of the manufacturers of porcelain facings and is still in use today," Dr. Bobbitt adds.

Dr. Hogan himself states that he is in excellent health, although his legs "have just spent too many years at the chair." His eyes are keen and he has no plan to retire; his wife and a daughter reside with him in Bedford.

DIGEST MAGAZINE, D.D.S., BEGINS PUBLICATION

The first issue of *D.D.S., A Digest of Dental Science,* was published in October. It contains articles condensed from 19 state journals, national specialty publications and foreign periodicals.

Editor-in-chief of the new magazine is Lester R. Cahn, associate professor of oral pathology at Columbia University.

Editorial communications may be addressed to Dr. Cahn, 888 Park Avenue, New York 21. Further information may be obtained from the managing editor, 74 Broad Street, New York 4.

CRUSADE FOR FREEDOM ENLISTS AID OF DENTISTS

Between November 11 and December 15 the Crusade for Freedom, a non-government organization which seeks to undermine Communism in satellite nations, will conduct its third annual campaign for funds to support Radio Free Europe and Radio Free Asia. In accordance with the unanimous resolution of the House of Delegates at the recent annual session, the Association is pledged to aid the Crusade for Freedom with both contributions and volunteer service.

The Crusade for Freedom was organized in 1950 by a group of Americans "unwilling to let the government bear all the responsibility for fighting Communism." Its first act was to send the 20-ton Freedom Bell to Berlin, where it still rings out over the divided city.

The Crusade's main purpose, however, was to raise funds for the newly-formed Radio Free Europe, a privately operated voice of freedom whose purpose was to undermine Communism in the satellite nations of Central Europe.

In 1951, during its campaign for funds, the Crusade for Freedom launched 10,000 balloons carrying 13 million leaflet messages across the Iron Curtain into Czechoslovakia and Poland. Last year the Crusade added the support of Radio Free Asia to its support of Radio Free Europe.

International Correspondence

NEWS FROM AUSTRALIA

As this is the first newsletter to THE JOURNAL, I thought it would be more useful for readers to be given a general picture of the dental scene in Australia and then subsequent information will be of more value. I have, therefore, divided the newsletter into sections covering the main aspects of the subject.

LEGISLATION

The right to practice dentistry in Australia is conferred through legislation administered by the six State Dental Boards of New South Wales, Victoria, Queensland, South Australia, Western Australia and Tasmania and in the Australian Capital Territory, the Northern Territory and territories outside Australia but under the administrative control of the Australian Government by legislation administered by the Australian Government.

Reciprocity of the right to registration as a dentist in any of these seven spheres of control exists for graduates in dentistry of the universities of all states except Tasmania, where facilities do not exist for university education in dentistry. Some states recognize a number of foreign qualifications, either as additional qualifications for dentists holding registration status or as a preliminary qualification allowing the holder to take the local state dental board registration examination. Other foreign qualifications are without any status, but may be recognized by universities as allowing a concession of one year, or in some cases two years' reduction in the length of the normal course for graduation at a degree standard.

EDUCATION

The course for dentistry at the various universities leads to graduation with a junior degree of Bachelor of Dental Surgery or Dental Science. Senior degrees of Master of Dental Surgery and Doctor of Dental Science are given for advanced study. Postgraduate study courses are organized in various fields of study.

RESEARCH

Associated with the University of Sydney and the United Dental Hospital of Sydney is the Institute of Dental Research, where work is directed to investigations in biological projects and is supported largely by grants from the State Government of New South Wales.

In Melbourne the Commonwealth Bureau of Dental Standards is actively engaged in research into properties of various materials and its work is supported by the Australian Government.

Additional research projects are, or have been, carried out by private individuals with the aid of grants from the National Health and Medical Research Council, and research is constantly being carried out at the various universities.

ASSOCIATION

The profession is organized on a federal system with each state having its own association for dealing with domestic affairs. Each state association is a member of the Australian Dental Association.

The foreword taken from the recently revised Constitution of this body gives briefly the facts concerning the growth and development of the Association:

"The first federation of dental societies in the Commonwealth occurred in 1909 when an organisation known as 'The Australian Dental Association' was formed.

"In the following year the name was changed to 'The National Dental Association,' the first meeting of this Association being held in May, 1911. At this meeting delegates represented three societies in New South Wales, two in Victoria, and one in Queensland, South Australia and Western Australia. During the period 1911-1928 there was some fusion of various societies in both New South Wales and Victoria.

"Australian Dental Congresses had been held in various capital cities since 1907. At

the Sixth Australian Dental Congress held in Melbourne in August, 1927, a special meeting of the Congress resolved to revert to the original title of Australian Dental Association.

"At Canberra on the 19th June, 1928, a meeting of delegates representing the five state societies took place; Articles of Association were drawn up and adopted, and a Federal Council of the Australian Dental Association constituted. This Council met on the following day, when it decided titles and arrangements for State Branches and for the general management of the Association.

"The Tasmanian Branch was formed in August, 1928, and was represented in the second meeting of the Association, which was held in Brisbane in July, 1930.

"Whereas the National Dental Association had been a federation of individual societies, sometimes three in one State, the new Association allowed for a federation of State Branches constituted by an amalgamation of the various individual societies in any state."

The Constitution as adopted in 1928 was revised in 1935 and again in 1951.

The office of the Association is maintained either in Sydney or Melbourne, depending on the situation of the president, and the administrative tasks are performed by a small executive committee which is responsible to the Federal Council, which normally meets annually.

A Congress of the Australian Dental Association is held at intervals of not more than three years. The next Congress is to be held in Brisbane, Queensland, in June 1953.

Two journals are currently published. In Victoria, the *Australian Journal of Dentistry* is published by the Australian College of Dentistry, University of Melbourne, which serves as the official organ of the State Branch of Victoria, Tasmania, South Australia and Western Australia. In New South Wales, the *Dental Journal of Australia* is published by the local branch. The first journal is published six times annually; the second normally is published 12 times annually, but with current difficulties of production is restricted to six.

Total membership of the Association stands at 2,487.

With the passing of the Labour Government from office, the main activity of the Association has been to deal with the many problems associated with the importation, in greatly restricted amounts, of dental materials, and to the matters of pharmaceutical benefits provided by the Australian Government, through its considerably reduced social service program. It will be appreciated that the present Liberal-Country Party Coalition Government developed a considerably modified social services program, pharmaceutical benefits being restricted to a few "life-saving" drugs, and medical benefits being available to those people who hold membership in some form of approved medical benefits insurance fund. The federal government also disburses funds to assist various hospitals in carrying out services on a wide scale to the public.

STATE SERVICES

State dental services are provided at certain special institutions and through the dental section of the medical services of the departments of education. Some states provide special services for country districts by means of traveling dental clinics, either attached to railway services or by means of road transport or a combination of both. In the remote areas of the Northern Territory such road transport facilities are augmented by aerial services coordinated with similar medical services provided by the Australian Government.

The present times are difficult for the general practitioner, who is beset with problems of rising costs, increased "consumer resistance," restricted imports and the general instability of the economic situation.

With regular meetings of the branches of the Association and Congresses at appropriate intervals, however, there is always a ready exchange of ideas, and as long as we can obtain overseas journals and have the pleasure of welcoming such highly competent persons as Dr. J. M. Schweitzer, who visited recently, and Dr. Wilfred H. Terrell, who visited the Twelfth Congress, our burdens are much lighter to bear.

Robert Harris, Sydney

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editors reserve the right to edit all communications to fit available space and require that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

THE USE OF MEPHENESIN FOR MUSCULAR RELAXATION

A word of caution on the use of mephenesin in dental practice would seem to be advisable, since articles on the subject have been appearing in the literature.

Mephenesin is a drug with powers and effects somewhat similar to the curare group of drugs, though differing in that it has sedative effects as well as local anesthetic action. Like the curare group it is a skeletal muscle relaxant.

When given in suitable doses it affects certain parts of the brain, causing a temporary paralysis, thus providing skeletal muscular relaxation and relief from certain involuntary movements which make dental operations on cerebral palsy patients difficult or impossible.

Any agent or drug that will paralyze any part of the brain is a potent power for harm as well as good. Therefore no one should use such a drug without a thorough knowledge of its effects and side effects.

There has recently appeared in THE JOURNAL a preliminary report on "The Dental Use of Mephenesin in Cerebral Palsy Patients"[1] which is well worth reading with care. However, there seems to be some discrepancy in the author's statement of dosage and the amounts shown in a table of patients given this medication.

The author of the report states that the dosage given is 0.5 gram per 50 pounds of body weight, which is equivalent to 1 gram per 100 pounds of body weight. This is in accordance with generally accepted dosage. New and Nonofficial Remedies[2] gives the dose as "1 Gm. three to five times daily." It is assumed that for dental operations it would be unnecessary to repeat the dose. At least the author makes no mention of repeated dosages.

Merck Index, Sixth Edition,[3] gives the adult dosage as 0.5 to 2.0 Gm.

However, in the article referred to, the table headed "Administration and effect of mephenesin in the treatment of cerebral palsy" reports much larger doses:

First patient, a child of 20 pounds, is given a dose of 7.7 Gm. This is more than 38 times the dosage given in the text, as well as at the bottom of the table.

The last patient, a man of 134 pounds, is shown to have received a dose of 26.95 Gm. This is more than 20 times the specified and accepted dose. The dosages of the other 33 patients listed range between the two extremes mentioned.

Obviously something is wrong with these figures, or with the way in which they are presented. The author, Dr. Album, evidently is trying to convey some useful information; but he should follow through with a more definite explanation of what the figures mean. If the figures in the table are those of aggregate doses over a period of time, he should specifically so state, in order that someone may not follow the table in the administration of mephenesin. Human life is too valuable to be tampered with carelessly because of misinformation.

A. T. Rasmussen, D.D.S., La Crosse, Wis.

1. Album, Manuel M. The dental use of mephenesin in cerebral palsy patients. J.A.D.A. 45:165 (Aug.) 1952.
2. Council on Pharmacy and Chemistry, American Medical Association. New and Nonofficial Remedies. Philadelphia, J. B. Lippincott Co., 1952, p. 432.
3. Merck and Co., Inc. The Merck Index of Chemicals and Drugs (Sixth Edition). Rahway, N. J., Merck and Co., 1952.

SUGAR CANE CHEWING AND CARIES

S. Dreizen and T. D. Spies, in their article entitled "The incidence of dental caries in habitual sugar cane chewers," confirm earlier observations by King and Martin (Brit. D.J. 90:35) that caries incidence is high in the Caribbean Islands. Their conclusions reaffirm the absence of any protective factors in natural, unrefined carbohydrates.

The title which they selected, emphasizing as it does "sugar cane chewers," in conjunction with their findings of a high incidence of caries may give the impression that the chewing of cane is one of the major factors in

producing caries in that area. This implied deduction is erroneous; that is, cane chewers may have excellent teeth, as is apparent in some of the less sophisticated areas of the Southwest Pacific.

In Hawaii and in the Caribbean (cf. King, Brit. D.J. 90:35) cane chewing has been largely supplanted by the ingestion of milled cane juice or by the effortless sucking or munching of the usually split cane. Even incipient unattended caries, not to speak of rampant cases, will interfere with any attempt at really vigorous mastication. The emphasis on cane chewing in the paper to which I refer is unjustified, furthermore, by the fact that the harvesting season is relatively short; during eight to nine months of the year there is no cane available for chewing.

In an experiment of three years' duration, we attempted to introduce sugar cane into the diet of teen-age boys resident in New York State (H. H. Neumann, W. Lefkowitz, N. A. Di Salvo, J.D. Res. 31:200). Our intention was to increase the hard bulk in an otherwise soft diet. In our favor was the possibility of cold storage of the cane and thus of year-round distribution, which is not practiced in the Caribbean, and moreover of close supervision of the chewing. From our experience we concluded that we could not advocate sugar cane as a means of increasing function, because of the ease with which this purpose may be evaded: that is, sucking and lazy munching may be substituted for real chewing, especially by children with initially poor teeth.

Since the two factors—ineffectual chewing and periodic unavailability of sugar cane—may be combined in the Caribbean, it seems unwarranted to imply that cane "chewing" may be contributing to the high incidence of caries.

If adequate masticatory function should induce resistance to caries by affecting the enamel structure or through another mechanism, then eight months of nonfunction out of the year would leave cane chewing alone a most unsatisfactory criterion. A food such as bread, widely available and greatly variable in consistency, seems a good subject for experiment and observation.

Dreizen and Spies refer to the presence or absence of certain vitamins in the Cuban and southern Italian high carbohydrate diet in regard to caries. I suggest that the physical properties of the bread eaten in that diet may be equally or more significant.

The observations described by Dreizen and Spies render a sound foundation to their conclusions regarding the absence of protective factors in natural, unrefined sugars and they offer a valuable survey of oral lesions and nutritional conditions. The inference to "chewing," though, cannot be accepted but in the very loosest sense of the term.

H. H. Neumann, M.D., New York

INCIDENCE OF DENTAL CARIES IN HABITUAL SUGAR CANE CHEWERS

The study of Dreizen and Spies[1] will be true only for the quality of cane consumed by the natives under observation. Sims and Volk of Florida University found that in a certain plant grown in different soils, the mineral content varied 200 per cent. Albrecht found variation in the protein content of a given plant under different soil conditions and hybridization. The probability is that the cane used was the product of soils long commercialized and therefore low in the mineral-protein category.

Although the conclusions of Dreizen and Spies will fit modernized man, they do not fit the known caries-free isolated peoples eating high carbohydrate diets. It may be that the elusive factor is a product of the fertility of primitive agriculture which is lost by commercial methods of soil management and monoculture.

Everard Turner, L.D.S., Leicester, England

1. Dreizen, S., and Spies, T. D. The incidence of dental caries in habitual sugar cane chewers. J.A.D.A. 45:193 (Aug.) 1952.

AN INVITATION TO SOUTH AFRICA

The South African Dental Association is holding its second national Dental Scientific Congress and Dental Trades Exhibition in Johannesburg during the first 12 days of May, 1953.

This occasion will differ from the first, which took place in 1936 during the British Empire Exhibition, in that we hope to have with us a number of distinguished colleagues from overseas, and by so doing, to acquire a strong international flavour.

The South African Dental Association must be one of the smallest in the world; its membership numbers close upon 1,000; and being widely scattered in a huge and sparsely populated country, it has many difficulties to face. In addition, its isolation from the rest of the world, even with an improved air service, tends to exaggerate these problems.

Most of our dental surgeons qualified either in the United States or in Great Britain, but within recent years the establishment in Johannesburg of an oral and dental hospital

with full teaching facilities has enabled us to depend less on overseas schools. Our locally qualified men have had an extensive and sound training, and many of them are numbered amongst our best dentists.

The oral and dental hospital has been entirely rebuilt in new surroundings; it is probably one of the finest of its kind in the southern hemisphere, and we shall be proud to introduce it to our friends from overseas at the Congress next year.

The (Dental) Association (of South Africa) is prepared to make provisions for accommodations and travel . . . to show visitors some of the country whilst they are here; if they have time to spare, we shall be glad to organise trips . . . to the now famous Game Reserves, to the Gold and Diamond Mines and many other attractions too numerous to mention. In short, it will be a golden opportunity for some to attend our Congress as part of an interesting holiday in a country of which comparatively little is known to the U. S. A.

Alan Deverall, P. O. Box 5247, Johannesburg, South Africa

Editor's note—Any member of the American Dental Association who is interested in attending the South African Congress is asked to communicate with Harold Hillenbrand, American Dental Association, 222 East Superior Street, Chicago 11.

EVALUATION OF AIRBRASIVE BY A DENTIST

Since my short résumé of experiences with the abrasive technic was published in the June 1951 issue of THE JOURNAL, I have continued to use airbrasive in my practice. I am more enthusiastic than before, for many reasons.

First, my patients are very receptive to airbrasive and express their appreciation to me for giving them a service which removes their apprehension about dental services. During the most complex operations, my patients are composed and relaxed.

Airbrasive simplifies many operations. Recently a patient complained of soreness and pain from pressure and thermal changes in an anterior tooth which had been filled. The roentgenogram showed a rarified area, and the filling had to be removed—usually a very painful operation unless done under anesthetic. With the airbrasive, I removed the silicate filling, opened the pulp chamber and obtained drainage in about five minutes with no drugs and little discomfort to the patient.

The rubber dam has proved to be most convenient. Until I bought my airbrasive unit, I had not used a dam in 25 years. Now I like it and it reduces my operating time. It does away with patients' talking, spitting, washing the cavity. No time is lost in changing from the handpiece to the right-angle or in changing burs, as the airbrasive compound never loses its cutting edge.

Airbrasive is effective in removing decay. By viewing a roentgenogram under a magnifying glass, a dentist can determine the depth of decay and can detect the proximity of the decay to the pulp chamber. The soft decay may be removed with a spoon excavator; the remainder is removed by adjusting the machine to high pressure and by using dolomite. The unit may be adjusted for cutting if some decay is left.

This technic works exceptionally well in gingival cavities, especially on the buccal of upper first and second molars. These cavities can be cleaned out with little discomfort to the patient. Airbrasive makes it possible to cut that occlusal step a little deeper, especially on lower bicuspids.

Finally, airbrasive is appealing to children, our patients of the future. I know that the majority of dentists are respected and appreciated by their patients, but we must make dental services more attractive to patients. I believe airbrasive can do this.

Harold J. Roach, D.D.S., Detroit

Book Reviews

MODERN DRUG ENCYCLOPEDIA AND THERAPEUTIC INDEX

Edited by Marion E. Howard. Fourth edition. 1431 pages. Therapeutic, Generic Name, Manufacturers' and Distributors' Indexes. Price $12. New York, Drug Publications, Inc., 1952.

The new edition of this reference book includes descriptions of a great many drugs introduced since 1949. As in the past, these concise descriptions are based upon information furnished by the manufacturer, but an attempt is made to exclude unreasonable claims and to check the material against standard texts or original sources. The drugs are listed alphabetically by their proprietary names and have cross-references in the several excellent indexes. The new generic name index is intended to show at a glance the names of all therapeutic agents listed by the Council on Pharmacy and Chemistry of the American Medical Association in *New and Nonofficial Remedies.*

The Encyclopedia is not to be regarded as a critical "official" compendium, but it is valuable, within the foregoing limitations, as an up-to-date source of unofficial information concerning new products that may or may not be listed in the standard volumes such as the *U. S. Pharmacopeia, National Formulary, U. S. Dispensatory, New and Nonofficial Remedies* and *Accepted Dental Remedies.*

The dental practitioner may occasionally desire to refer to this book, but he should clearly understand that not all of the products listed are of established value in therapeutics.

Sholom Pearlman

LOGIC FOR LIVING

By Henry Horace Williams. Edited by Jane Ross Hammer. First edition. 281 pages. Index. Price $3.75. New York, Philosophical Library, 1951.

This book is a presentation of a series of lecture-discussions recorded in 1921-22 by one of Dr. Williams' former students, and arranged in book form by the editor.

Dr. Williams taught philosophy at the University of North Carolina with a modified question-and-answer, lecture-conference method; hence, the book contains, in addition to Dr. Williams' remarks, comments by the students themselves.

It is impossible for any conscientious reviewer to be purely objective in commenting upon a book of this sort, since one's philosophy is a personal and intimate thing. This reviewer believes that philosophy is neither an art nor a science with more or less fixed, underlying principles, but is more like love or religion. One chooses his particular philosophy of life according to his taste and instinct. The fact that so many educators and writers have attempted to make philosophy an art or a science in so many different ways, with such heterogeneous and conflicting results, indicates its inexactitude.

One may well wonder about the necessity of subscribing to any philosophical formula. Perhaps no philosophy is as good as any philosophy, and many prefer to live in the immediate and somewhat comprehensible present, finding what happiness life may afford without yearning for blueprints of the future. (The reviewer is aware, of course, that even this simple philosophical perspective may have been classified somewhere by the catalogists and appropriately garbed in nomenclature, but he has little inclination to look into the matter.)

For the foregoing reasons it would seem most logical for this reviewer to regard *Logic for Living* simply on the basis of whether it is successful as a book. It is readable, and its contents are presented in an original manner. Perhaps its greatest value as a work of entertainment lies in the fact that it presents to its readers the portrait of a real and conscientious teacher who thoroughly loved his work and whose foremost objective in teaching was the stimulation of students in the thinking process. That accomplishment, itself, is quite a difficult thing to achieve, as any observant teacher well knows.

Logic for Living should be particularly interesting to Dr. Williams' former students and to those readers of the general public who are interested in the subject of philosophy.

It is a matter of historical interest that Thomas Wolfe, the great intuitional philosopher-poet-novelist, once attended Dr. Williams' classes, and that he has made reference to Dr. Williams as "the Hegel of the cotton patch."

Anderson M. Scruggs

INLAYS ET ONLAYS—BRIDGES SUR DENTS VIVANTES

By R. le Huche. First edition. 242 pages with 177 illustrations. Index. Price 1660 fr. ($4.75). Paris, France, Julien Prelat, 1951.

Drawing freely upon the literature and publications which have already appeared in the American dental literature, the author starts out with a general review of the principles of cavity preparations. These follow the principles outlined by G. V. Black. He uses many excellent line drawings and illustrations to bring out the variations in these cavities. However, in some of the drawings the author recommends the beveling of the cavosurface angles even in those areas where the direction of the enamel rods does not seem to require such a procedure.

Unfortunately, the author is apparently unaware of many previous reports in the literature on his subjects, for he fails to give original authors proper credit. Among the many types of cavity preparations, he discusses quite fully the Knapp slice preparation and the Gillett channel preparation. In 1895 Dr. Weeks originated and published both of these ideas in cavity preparation.

He also presents supplementary retention by the employment of a "clavette." This supplementary key is inserted into a keyway, half of which lies within the casting and the other half in the tooth. The long axis of this "clavette" is usually placed at right angles to the direction of displacement of the casting. This principle has been employed and fully described in American literature many years ago.

In discussing the ¾ type of posterior veneer crown, the author bases his criticism of this preparation on his conception of a preparation which was discarded in this country over 25 years ago. Refinements have been made since the days of the Carmichael crown. Contributing to these improvements was Edward Tinker, and the illustration (Figure 57) attributed to Tinker certainly does not represent the ideas that he advocated in the preparation of this type of bridge retainer. It is unfortunate that a misconception is given regarding this preparation.

Many sections of the book are well done. The discussion and description of the pinledge type retainer is excellent, and many ideas are presented which are worthy of careful study and application. The author also discusses tooth anatomy in its relationship to the various types of preparations, something that is usually overlooked or disregarded.

In the latter part of the book the author discusses both the direct and indirect methods of constructing inlays and bridge retainers, describing minutely the use of the hydrocolloid and other impression materials. His presentation of matrices and the construction of wax patterns is comprehensive. The vacuum mixing and investing technic as developed by George Hollenbeck is fully illustrated and discussed.

The latter part of the book is devoted to the paralleling of bridge preparations and is excellently done; it is one of the best portions of the text. All in all, this book should be a very valuable contribution to the French dental literature.

Stanley D. Tylman

LOS DIENTES: HIGIENE Y PROFILAXIS BUCO-DENTARIA

By Berge Der Boghosián. 206 pages with 90 numbered and several unnumbered illustrations, 2 in color. Montevideo, García Morales—Mercant S. A., 1951.

This volume is a treatise on the elementary principles of dentistry from the formation of the teeth in utero to daily oral hygiene. The book is unusual, not for the facts it contains, but for its composition by preparatory students as the practical part of the chemistry course in the Uruguay public schools.

Among the chapter headings are these: hormones, vitamins and ferments: their relation to biology of the teeth, bones, gums and periodontium; hemorrhage, coagulation of the blood; hemorrhage of dental origin; ingestion and immunity; pregnancy, nursing period, infancy and dental health; drinking water, dental defects and caries; role of fluorines and iron. An appendix contains essays on such subjects as medicine in the nineteenth century; Semmelweis and the tragedy of puerperal fever; discovery of vitamins; struggle against infectious illnesses; genesis and evolution of chemical therapy.

The final pages of the volume contain quotations from Szent Grörgi, some of which are the following:

"The ideal of modern medicine is not curing as much as preventing illness."

"Health means only an exact adjustment to the environment, in which one fits as a cog in a machine."

"Illness is not an attribute of life; rather life's essence is perfection and a complete lack of suffering."

The volume closes with an expression of hope that the light of reason and peace will triumph in the world.

Grace Nichols

BRITISH SCIENTISTS

By E. J. Holmyard. 88 pages. Illustrated with 24 portraits. Price $2.75. New York, Philosophical Library, Inc., 1951.

The author has skillfully packed into a very few pages a panoramic view of the achievements of British scientists, a view which diminishes the distance between the Dark Ages and the present age of rapidly advancing scientific knowledge and allows re-evaluation of each man's contribution.

The author points out that many of today's great industries could not have developed without the knowledge created by these early basic scientists. The reader is made to realize overwhelmingly that the benefits that accrue to mankind today were made possible by the basic research of centuries ago, and that today's new knowledge will affect mankind in the centuries to come.

Paddy Rudd Howes

PARADENTITIS UND PARADENTOSE

By Ewald Harndt, professor of tooth-mouth-jaw therapeutics, University of Berlin. 180 pages with 291 illustrations. München, Carl Hanser Verlag, 1950.

This volume is a textbook on diseases of the periodontium. Its chapters deal with such topics as inflammatory processes, diagnosis, complications, course of treatment, surgical therapy, overload and its release, dentures and prognosis.

G. Nichols

LEHRBUCH DER ZAHNARZTLICHEN KRONEN-UND BRUCKENPROTHETIK VOLUME I: KRONENPROTHETIK

By Dr. Gottlieb Vest. 296 pages with 362 illustrations. Index. Price 36 Swiss francs. Basel, Switzerland, Verlag Birkhauser, 1951.

This book is the first volume of two German language books dealing with crown and bridge prosthesis. Volume I is devoted entirely to the construction of crowns.

The subject is covered in 16 chapters, profusely and well illustrated with 362 illustrations. An index and a rather limited and incomplete bibliography are included.

The book is written primarily as a text for European dental students. Unfortunately, the author disregards the progress and improvements that have been made in this field of restorative dentistry during the past 10 years, for most of the text is devoted to obsolete technics. While the book may serve a limited purpose abroad, it cannot be recommended either as a textbook for students or as a reference book for practitioners in this country.

Stanley D. Tylman

ZAHN-, MUND- UND KIEFERHEILKUNDE

Lectures collected by Gustav Korkhaus, Bonn. 150 pages. München, Carl Hanser Verlag, 1950.

This volume, the fourth of a series on tooth-mouth-jaw therapeutics, is entitled *Caries Formation and Prophylaxis.* The ten essays it contains were given by various German professors at the Dental Therapeutics Session held in Wiesbaden in 1949.

A TEXTBOOK OF GENERAL PHYSIOLOGY

By Hugh Davson. 659 pages with 288 illustrations. Index. Price $7. Philadelphia, The Blakiston Co., 1951.

The science of physiology may be conveniently divided into general physiology and special physiology. In medical, dental, optometric and veterinary schools the latter is studied almost exclusively. Its subject matter deals with the functions of the various specialized organs of the more highly evolved vertebrates, especially mammals. It strongly stresses the high degree of coordination of these multitudinous functions which results in a most wonderfully integrated, animated machine.

In contrast, general physiology deals more with the basic nature of the functions of all plants and animals. It is particularly interested in what takes place in the individual cell and strives to formulate these findings in broad and universally applicable biological principles. It attempts, whenever possible, to express vital activities in terms of physics and chemistry.

In Professor Davson's book the first 100 pages are devoted to the study of the structural basis of living matter. In this, the latest methods of investigation are employed: histo- and micro-chemistry, polarization and double refraction, the ultra-violet and the electron microscope, to mention just a few. Here great stress is laid on the importance of nucleoproteins, the basic material of viruses, chromosomes, and perhaps of all living stuff.

The second part of the book deals with the utilization of energy and the production and loss of heat by the living body. This is followed

by over 200 pages on "Transport of Water and Solutes." Parts four and five are concerned with the physiology of nerves and muscles, respectively.

In the concluding part the author discusses "Light: Its Effects on, and Its Emission by, the Organism."

To the student of the science of physiology Professor Davson's *General Physiology,* because of its extensive scope and its masterly presentation of the subject, is invaluable. To most dentists working in an exceedingly restricted field and being interested primarily in knowledge applicable to the prevention and cure of ills befalling the oral cavity, this book is of limited value.

W. D. Zoethout

THE PHOSPHATIDES

By Harold Wittcoff. First edition. 564 pages. Index. Price $10. New York, Rheinhold Publishing Corp., 1951.

The phosphoric acid containing lipides, the phosphatides, are widely distributed in biologic systems. They act interchangeably in fundamental structural and metabolic functions of the organism.

This volume provides a complete and authoritative review of the chemistry and of the biological implications of these compounds. The text is organized into six major divisions: The Chemistry of the Phosphatides, The Analytical Determination of the Phosphatides, Phosphatides from Plant Sources, Phosphatides from Animal Sources, The Biochemistry and Physiology of the Phosphatides and The Industrial Aspects of the Phosphatides.

Extensive bibliographies including the recent literature follow each of the sections. The material is presented in a clear fashion which is enhanced by the critical interpretations of the author. This is an indispensable reference to the field of lipide chemistry.

M. B. Engel

ORAL MEDICINE

By Lester W. Burket. Second edition 575 pages with 372 illustrations, 40 in color. Index. St. Louis, J. B. Lippincott Co., 1952.

The second edition of *Oral Medicine* in many respects is a new book rather than a new edition.

Although much of the old book has been retained, this edition has valuable additions and is improved in arrangement and presentation of material. The new format makes the book easier to read. Many illustrations have been changed and new ones have been added. The color plates are entirely new, and although fewer in number, they are better selected than the first and the color reproduction is much improved. The new arrangement of material makes the book more suitable for systematic study and more useful as a text.

The reviewer is favorably impressed with changes and additions that have been made in the chapter on gingivitis. Some difference of opinion may be found in the author's use of terms related to the fusospirochetal diseases of the mouth. As in the first edition, he has used the term Vincent's stomatitis, in preference to Vincent's infection or ulceromembranous stomatitis, as being the most descriptive and consequently the best choice of a group of unsatisfactory terms. Regardless of terminology the chapter is an excellent presentation of cause, diagnosis and treatment.

One of the most important changes is the addition of a new chapter on oral cancer by S. Gordon Castigliano. He introduces the subject with a statistical survey of oral cancer and its comparison with malignancies in other body sites. The tables and data are well chosen and lucidly presented. The reviewer takes exception to Dr. Castigliano's statement that "Experience with dental students shows that even after completion of basic courses in general pathology and oral pathology, *less than 30 per cent* of the students have a reasonably accurate or full understanding of such fundamental words as tumor, neoplasm, benign, malignant, cancer, carcinoma, sarcoma, primary lesion, secondary lesion and metastases."

He discusses at length the "career of oral epidermoid carcinoma" including the treatment delay which contributes to a low salvage rate in oral cancer patients. The reviewer concurs with the placing of emphasis upon epidermoid carcinoma since about 90 per cent of the oral cancers are of this type.

The presentation of a discussion of biopsy is generally good, but the reviewer cannot agree with the principle of noninclusion of normal tissue in a biopsy. Dr. Castigliano's discussion of "The Management of Teeth in Oral Malignancy" is excellent, and every dentist would profit immeasurably by reading this topic. This chapter on oral cancer is well written, basically complete and is a worthy part of the volume.

The whole book is a valuable contribution to the literature of dentistry and medicine. It should be read by every student and every practicing dentist.

Thomas J. Hill

Current Literature

BACITRACIN AND GELFOAM,
COMBINED USE IN DENTISTRY

Albert D. Alexander. U. S. Armed Forces M. J. 2:1247, August, 1951.

There are definite advantages in the use of Gelfoam impregnated with bacitracin for the postextraction wound. A combination of the two materials, prepared and used according to specific directions, was found satisfactory in the treatment of over 1,000 patients.

K. N. Morrison

ACCOMPLISHMENTS OF
NAVAL DENTAL RESEARCH

Carl A. Schlack. U. S. Armed Forces M. J. 2:1195, August, 1951.

Under provisions made for Naval dental research, a number of projects were undertaken. The scope of the research is impressive; a few of the studies include: oral effects of ionizing radiations, temporomandibular joint disturbances, ammoniated tooth pastes, strength of filling materials and diagnosis of precancerous oral lesions.

K. N. Morrison

THE PRESENT CONCEPTION
OF THE AETIOLOGY AND
HISTOPATHOLOGY OF DENTAL CARIES

Cecil Hearman. Austral. J. Den. 55:256, August, 1951.

There are three common theories of the cause of dental caries. The structural theory, which gained prominence as the result of Mellanby's investigations into the nutritional aspects of dental caries, for the most part, is unsatisfactory. The acid decalcification theory satisfies the general clinical, histopathological and bacterial picture of the lesion in most respects; but there are five conditions which this theory does not explain satisfactorily. The proteolytic theory deals with the need for a mechanism such as proteolysis to dispose of the organic constituents of dentin and enamel.

The role of the dental plaque and the structure of the enamel surface are aspects of the study of the caries process.

The successive stages of the carious lesion are summarized in 12 statements.

D. S. Chernausek

JOURNAL OF ORAL SURGERY
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FACIAL FRACTURES

Merritte M. Maxwell, p. 95.

Insofar as the general physical condition of the patient permits, all fractures of facial bones should be reduced as soon as possible. Early gross reduction of multiple facial fractures by simple finger or instrument manipulation and uncomplicated immobilization by wire, ligatures or elastics may mean the difference between a good and a poor end result. Hemostasis with prompt suturing has distinct cosmetic and functional advantages when utilized prior to the advent of swelling and infection. Immediate closure would necessarily be avoided in instances of suppurating, frankly infected wounds. Conservative or partial closure is the method of choice when sizable segments of facial tissue are evulsed.

Visual inspection of the normal anatomic landmarks is sufficient to disclose gross displacements of the facial structures, asymmetries and facial paralysis due to an injury of the facial nerve. Visual inspection may be supplemented by simultaneous bimanual palpation. With intraoral and extraoral digital examination, points of tenderness and disruptions and depressions of normal bony contours can be detected. Roentgenographic examination is generally considered conclusive evidence of fractured bones. Skull roentgenology poses a more difficult problem because of the multiplicity of shadows which are encountered. Psychosomatic influences related to facial fractures complicated by lacerations and loss of tissue are of great importance. Assurance that combined specialized skills applied over a period of time will make patients presentable members of society serves to generate hopeful attitudes and to gain active cooperation. Two basic principles determine the elaboration of all plans of treatment for facial fractures. First and most important is the restoration of function within normal limits and second is the restoration of cosmetic form. The treatment of facial fractures may be considered as a sequence consisting of five phases: emergency and early care, establishment of diagnosis, formulation of a plan of treatment, definite treatment and follow-up procedure. Closed reduction is the method of choice unless clear-cut indications necessitate the open approach. Some of these

indications are malunion, nonunion, comminution and foreign bodies in the region of the fracture.

TRAINING AID FOR THIRD MOLAR SURGERY

Charles R. Shea and John V. Niiranen, p. 104.

A model was devised for demonstrating the removal of impacted third molars. The teaching model was made from an impression of a mandibular arch having a normal number of teeth except that the third molars were not erupted. The mandibular arch was then duplicated in methyl methacrylate in tooth and tissue colors. Next, the mucous membrane from the first bicuspid region to the posterior extension of the model was removed; in its place a flexible vinyl resin mucous membrane was substituted, which had been prefabricated from a metal mold. A square opening was cut in the model immediately distal to the second molar; in this opening a plastic cup approximately 1¼ inches square was placed which would later receive the extracted tooth. A screw was inserted in the distal portion of the model to hold the plastic cup in place.

After the tooth is removed from the patient, it is reassembled and placed in the plastic cup in the same position as it was in the mouth. In the plastic cup it is surrounded with a mixture of stone and vinyl resin, which resembles and simulates bone. After the stone has set, the block is placed in position underneath the vinyl resin mucous membrane; and the tooth is ready to be removed again.

MONOSTOTIC PAGET'S DISEASE OF THE MANDIBLE

Eli Olech, p. 106.

Paget's disease of the bone is a disease of the skeleton characterized by simultaneous resorption and excessive formation of bone or bones affected. The etiology is unknown. Bones which are under particular mechanical stress seem to be involved most often. The disease does not spread from one bone to another across an articulation. The jaws are involved in about 17 per cent of the cases of polyostotic Paget's disease. In the early stage roentgenograms of the jaws reveal osteoporosis and an absence of lamina dura around the roots of the teeth in the involved zones. In the advanced stage sclerotic bone and hypercementosis of the roots of the teeth in the involved regions are observed. The lesion is never generalized but either polyostotic or monostotic from the onset; it develops rather rapidly in any bone once it is involved. The serum phosphatase level frequently is found to be higher in Paget's disease than in any other condition. In the absence of any other cause for a high phosphatase level, such as liver disease or obstructive jaundice, a high serum phosphatase level is probably indicative of increased osteoblastic activity. Paget's disease unquestionably predisposes to osteogenic sarcoma. Most osteogenic sarcomas arising after the age of 50 years are found in persons with Paget's disease.

NEUROFIBROMATOSIS

Franklyn S. Stillman, p. 112.

The neurofibroma, or fibroma molluscum, is the most prevalent cutaneous tumor. This benign tumor usually forms on a sessile base and is painless and slow-growing. When multiple neurofibromas are present, the condition is termed neurofibromatosis, or von Recklinghausen's disease. It is often accompanied by brown freckling and pigmentation, nevi, peculiar soft overgrowths of connective tissue and anatomic and functional disturbances of the central nervous system. It is known that in families where the condition is prevalent, tumors may develop in one member whereas the only apparent effect on another may be pigmentation. The condition affects the skin, mucous membrane, subcutaneous tissues, viscera, deep nerve trunks, bones and endocrine glands. Hirsutism and macroglossia are suggestive of an endocrine disturbance. Attempts at excision sometimes have been followed by the recurrence of a neurosarcoma of a low grade of malignancy. Radiation therapy is not successful in the treatment of neurofibroma. All the associated anomalies are due to changes in function of nervous tissue. Some suspicion should be cast in the direction of endocrine disbalance.

LATE RADIATION NECROSIS OF THE JAW BONES

Thomas J. Cook, p. 118.

Irradiation osteonecrosis is a complication encountered in the dental system after radiation therapy for cancer in and about the oral cavity. There is no essential difference between the reaction caused by roentgen rays and that caused by radium. In a series of 1,819 patients with intraoral cancer treated at Memorial Hospital, New York, irradiation osteonecrosis developed in 235 patients. Ewing ascribed the effect of irradiation on bone to interference with nutrition, a result of obliteration of the vascular supply from the periosteum, from the nutrient artery, from

capsular arteries and from the bone marrow and also to secondary irradiation due to high calcium content. Kanthak states that there are "three definite factors which seem to be conducive to osteoradionecrosis: Irradiation, infection, and trauma." Heavy irradiation of bone causes changes which are permanent and not always apparent. Bone is known to absorb more irradiation than soft tissue does because of its greater content of the heavier elements. Irradiated bones may remain normal for years unless they are traumatized or become secondarily infected, a development which may occur when an infected tooth is removed or when an intrabuccal ulcer forms. As a prophylaxis Watson and Scarborough advise removal of nonvital, loose, carious teeth before treatment is started. In certain instances sound teeth in the immediate vicinity of the neoplasm should be removed. The gums should be completely healed before treatment is begun. Kanthak waits for a line of separation of the dead bone to become apparent on roentgenographic examination and then performs a sequestrectomy; the usual period of waiting is about six months. Supportive measures are employed to increase general resistance, and a sequestrectomy is performed when indicated.

A TECHNIC FOR THE ROENTGENOGRAPHIC EXAMINATION OF IMPACTED MANDIBULAR THIRD MOLARS

Albert G. Richards, p. 138.

Impacted mandibular third molars frequently are portrayed inadequately on periapical roentgenograms because of incorrect positioning of the film packet in the mouth. For this reason a roentgenographic technic has been designed which requires two periapical roentgenograms of the mandibular molar region. The first film packet serves as a "scout" film and is positioned in the mouth with its upper edge parallel with and ⅛ inch above the occlusal surfaces of the erupted molars. The center of the packet is aligned roughly with the buccal groove of the second molar. The proper vertical and horizontal angulations of the beam are determined by directing the central ray at the neck of the second molar and parallel with both its occlusal and distal surfaces respectively. The position of the second film packet in the mouth is governed by information derived from the initial roentgenogram. The initial roentgenogram is placed with its lingual surface against the sensitive side of the second film packet. Then the film packet is rotated slightly behind the roentgenogram until its lower posterior corner extends sufficiently far beyond the incomplete image of the third molar to include the missing roots and apexes. With the initial roentgenogram still lying on the film packet, the point of a pencil is inserted carefully between them and two straight guide lines are drawn on the packet. The first, a vertical line, indicates the mesial surface of the second molar; and the second, a horizontal line, indicates the occlusal surface of the same tooth. The second film packet is positioned in the mouth with its vertical guide aligned with the mesial surface of the second molar and the horizontal line located even with the occlusal surface of the same tooth. The proper vertical and horizontal angulations of the beam are determined by directing the central ray at the neck of the second molar and parallel with both its occlusal and distal surfaces respectively.

SUPPLEMENTAL REPORT ON MENISCECTOMY IN TREATING LESIONS OF THE TEMPOROMANDIBULAR JOINT

Reed O. Dingman, p. 141.

In the July 1951 issue of the JOURNAL OF ORAL SURGERY the problem of meniscectomy in the treatment of lesions of the temporomandibular joint was discussed. Another feature has been added to the operative technic, which makes the procedure much easier. A small incision is made at the angle of the mandible on the involved side, and the angle of the mandible is exposed. The muscular attachments of the masseter muscles are incised to expose the bone. A hole is drilled through the bone, and a 28 gauge stainless steel wire is passed through the hole in the angle of the mandible. Both ends of this wire are grasped with a large hemostat. Tension is applied on the wire by an assistant. This makes it possible to draw the condyle some distance downward to provide an excellent view of the interior of the temporomandibular joint. If necessary, intravenous curare is given to obtain muscular relaxation.

PROGRESSIVE ADVANCED CASE OF OSTEITIS DEFORMANS

William J. Byatt and S. Ash, p. 143.

Osteitis deformans is characterized by an overgrowth of the bones with a concomitant softening which causes a change in the shape of the bones under stress of function. The etiology is unknown. The patients are usually men between 30 and 50 years of age. The onset is insidious; development of the characteristic symptoms is slow. Pain in the bones

and head may be present in the beginning but it lessens as time elapses. Paget's disease is distinctly different from acromegaly, which generally results in an increase in size of the mandible, the lower half of the face and the extremities, whereas Paget's disease generally results in greater enlargement of the maxilla and the upper half of the skull and the long bones of the body. The distribution of the osseous involvement, generally symmetrical, is in this order: skull, tibia, femur, spine, pelvis, ribs, radius and ulna. Roetgen-ray examination shows increased density of the bones, absence of normal bone markings, thickening of the bone cortices, localized periosteal thickenings, deformities and the fuzzy appearance of the outer table of the skull, which is characteristic of Paget's disease. The localized areas of osteoporosis and bone-building in the flat bones produce the curvilinear markings which are pathognomonic of this disease. The most frequent and extensive changes are observed in the maxilla. There is considerable osteoporosis of the maxilla with localized areas of increased density, which with the radiolucent areas produce the characteristic "cotton wool" appearance of the affected bone. The teeth become loose because of the destruction of the supporting alveolar bone; there is no roentgenological or histological evidence of abstraction of calcium from the teeth. Paget discovered no hereditary factor in the disease, but other investigators found instances of its presence in members of the same family.

PREOPERATIVE AND POSTOPERATIVE SEDATION FOR CHILDREN

George W. Matthews, p. 151.

The metabolic rate is higher at age five or six than at any other period in life; children of this age group require an amazing amount of anesthetic. Premedication makes a child much easier to manage and greatly reduces the amount of anesthetic required. Pentobarbital elixir is used for premedication. Children five or six years old require 2 drams, and those 10 or 12 years old can take 3 drams. The medication should be given about half an hour before the operation. To prevent postoperative pain, 16 mg. (¼ grain) codeine is given hypodermically while the child is under the anesthetic. If the child needs a prophylactic or therapeutic injection of penicillin, the best time to administer this is while he is under the anesthetic.

A SIMPLIFIED METHOD OF THIOPENTAL ANESTHESIA COMBINED WITH INTRAVENOUS MEPERIDINE

Daniel Verne, p. 152.

It is the purpose of this paper to describe a method of intravenous thiopental sodium and nitrous oxide-oxygen anesthesia, using intravenous meperidine hydrochloride (Demerol Hydrochloride) as an adjunct. It has been argued that the use of morphine and meperidine, potent depressors of respiration, increases the danger of overdepression of respiration. The aim of this method is to administer doses which never unduly depress respiratory function. One cubic centimeter of atropine sulfate is drawn into a 5 cc. syringe from a prepared bottle of atropine sulfate which contains 0.4 mg. of the drug per cubic centimeter. One cubic centimeter of meperidine hydrochloride is drawn into the same syringe from a prepared bottle which contains 50 mg. of the drug per cubic centimeter. A tourniquet is placed on the arm of the patient, and the solution is slowly injected into a suitable vein. A 20 gauge needle is used. It should take at least three minutes to inject the solution. The 5 cc. syringe is twisted off the needle, and the patient is told to keep the arm in the same position on the arm of the chair. The 20 cc. syringe is filled with a previously prepared mixture of thiopental and water which contains 0.5 Gm. of thiopental. This 2.5 per cent solution is then attached to the needle in the arm, and a test dose of 2 cc. is given. It is wise not to inject the thiopental too rapidly because meperidine and thiopental are respiratory depressants. Apnea results if the anesthetic solution is forced on the patient. When the patient has lost consciousness and the lash reflex has disappeared, the nasal mask is placed and the nitrous oxide-oxygen is started. The oxygen percentage is always 20 per cent or more. The syringe and needle are withdrawn at this time. At the completion of the operation the patient is given a few breaths of 100 per cent oxygen and the mask is removed.

Deaths

Adams, Fred R., Brooklyn; Pennsylvania College of Dental Surgery, Philadelphia, 1894; died July 17; aged 80.

Adsit, Harry B., Owatonna, Minn.; Dental School, Northwestern University, 1917; died May 19; aged 59.

Anderson, Frank E., Sioux Rapids, Iowa; College of Dentistry, University of Iowa, 1908; died August 14; aged 73.

Backus, Edwin I., Colorado Springs, Colo.; College of Dental Surgery, University of Michigan, 1894; died July 4; aged 82.

Bagley, George M., Oakland, Calif.; College of Dentistry, University of California, 1924; died September 3; aged 52.

Barton, William T. H., San Francisco; Dental School, Northwestern University, 1946; died July 3; aged 28.

Bergman, Arthur G., Chicago; Dental School, Northwestern University, 1907; died May 1; aged 69.

Birdsong, Victor L., Jackson, Miss.; School of Dentistry, Loyola University, New Orleans, 1937; died June 29; aged 37.

Bleyer, Leroy M., New York; New York College of Dentistry, 1907; died July 9; aged 65.

Bordner, Charles M., Westfield, N. J.; College of Dentistry, University of Pennsylvania, 1886; died July 27; aged 89.

Boslett, Francis J., Turtle Creek, Pa.; Philadelphia Dental College, 1903; died June 23; aged 77.

Bouldin, Edward P., Peoria, Ill.; Dental School, Northwestern University, 1926; died July 17; aged 56.

Bragg, Harold I., Columbia, Mo.; Dental School, Northwestern University, 1897; died August 1; aged 77.

Braun, Harry J., St. Louis; Marian-Sims Dental College, St. Louis, 1904; died July 1; aged 76.

Brown, Maurice V., Needham, Mass.; Dental School, Tufts College, 1911; died June 24; aged 64.

Carr, Harry C., Boulder, Colo.; Indiana Dental College, 1898; died August 13; aged 79.

Casler, John M., Toledo, Ohio; Dental School, Northwestern University, 1907; died August 12; aged 72.

Clark, Neil, Detroit; School of Dentistry, Royal College of Dental Surgeons, Toronto, 1923; died July 24; aged 55.

Cohen, Rose, New York; College of Dental and Oral Surgery, New York, 1917; died August 12.

Cole, Ray F., Portland, Ore.; School of Dentistry, North Pacific College of Oregon, Portland, 1915; died August 5; aged 66.

Coleman, Robert S., Savannah, Ga.; Atlanta Dental College, 1914; died June 16.

Cramer, William L., Groton Long Point, Conn.; College of Dentistry, University of Pennsylvania, 1898; died July 12.

Crissman, George B., Fort Collins, Colo.; American College of Dental Surgery, Chicago, 1895; died July 3.

Davis, George E., Bellerose, N. Y.; School of Dentistry, University of Pennsylvania, 1901; died August 19; aged 76.

Davis, Harry W., Jackson, Mich.; Department of Dental Surgery, Detroit College of Medicine, 1906; died June 22; aged 67.

Davis, Willis H., Middletown, N. Y.; New York College of Dentistry, 1914; died July 21; aged 70.

Dicks, Clarence W., Indianapolis; Indiana Dental College, 1898; died July 2; aged 76.

Dilmore, George S., Jr., Philadelphia; Medico-Chirurgical College of Philadelphia, 1907; died August 27; aged 78.

Diska, Leon A., West New York, N. J.; College of Dentistry, New York University, 1916; died July 19; aged 65.

Dixon, Harl C., Grants Pass, Ore.; died August 11; aged 74.

Donlon, Joseph P., Elkader, Iowa; College of Dentistry, University of Iowa, 1897; died July 23; aged 76.

Dunn, Benjamin C., Mabton, Wash.; died July 13.

Duplechin, John A., Eunice, La.; School of Dentistry, Tulane University, 1907; died July 25.

Eaton, Clyde H., Portland, Maine; Dental School, Harvard University, 1921; died June 25; aged 54.

Ebersole, Frank B., Davenport, Iowa; College of Dentistry, University of Iowa, 1913; died July 4; aged 64.

Echternacht, Harry F., Marshalltown, Iowa; Dental School, Northwestern University, 1898; died August 4; aged 82.

Elliott, Earle C., Providence, R. I.; School of Dentistry, Temple University, 1917; died June 28; aged 57.

Elliott, George H., South Nyack, N. Y.; School of Dentistry, Temple University, 1914; died July 3; aged 60.

Ellis, Lee A., Camden, Maine; Chicago College of Dental Surgery, Loyola University, 1920; died August 26; aged 60.

Feldmann, Floyd A., St. Charles, Mo.; School of Dentistry, St. Louis University, 1935; died July 9; aged 41.

Flanigan, Edward A., Pottsville, Pa.; School of Dentistry, University of Pennsylvania, 1913; died July 5; aged 60.

Freund, Henry, Brooklyn; died May 12.

Fry, Harry E., Miami, Fla.; New York College of Dentistry, 1902; died June 29; aged 68.

Garrott, Alva C., Los Angeles; College of Dentistry, Howard University, Washington, 1899; died July 17; aged 86.

Garvey, Allan W., Duluth, Minn.; Dental School, Northwestern University, 1917; died August 23.

Gelpi, Fernand J., New Orleans; School of Dentistry, University of Denver, 1929; died August 22; aged 53.

Gilliland, Harold C., Arkansas City, Kan.; Kansas City-Western Dental College, 1923; died August 18; aged 59.

Golden, Francis L., Trenton, N. J.; School of Dentistry, Tulane University, 1922; died August 5; aged 52.

Goldthorp, Ellsworth, Chicago; Dental School, Northwestern University, 1891; died July 9; aged 85.

Goodman, Samuel, New York; New York College of Dentistry, 1919; died March 24; aged 55.

Gray, Fred A., San Jacinto, Calif.; Chicago College of Dental Surgery, Loyola University, 1899; died June 20; aged 73.

Griffis, Walter M., Paris, Texas; died August 17.

Grigg, Leon A., Aberdeen, Wash.; School of Dentistry, University of Pennsylvania, 1915; died July 28.

Hargrave, John J., Bristol, Pa.; Philadelphia Dental College, 1906; died July 17; aged 72.

Harlan, Marcus A., Chicago; Chicago College of Dental Surgery, Loyola University, 1903; died August 15; aged 71.

Hawke, Ernest J., Long Beach, Calif.; College of Dentistry, University of Southern California, 1917; died June 15; aged 62.

Henderson, Frank B., Leavenworth, Kan.; Western Dental College, Kansas City, 1899; died July 27; aged 75.

Hesketh, William R., Los Angeles; Philadelphia Dental College, 1888; died August 31; aged 85.

Hessling, Harold W., Ottawa, Ill.; Dental School, Northwestern University, 1919; died August 30; aged 56.

Hiner, Arthur A., Ashland, Ohio; Dental School, Northwestern University, 1913; died June 26; aged 68.

Hood, Kenneth F., East St. Louis, Ill.; died August 2; aged 39.

Horton, Walter B., St. Marys, Ohio; College of Dentistry, Ohio Medical University, Columbus, 1899; died August 5; aged 77.

Hoskin, Sidney B., Portland, Ore.; School of Dentistry, North Pacific College of Oregon, Portland, 1916; died September 7; aged 61.

Hosking, Richard G., Placerville, Calif.; College of Physicians and Surgeons, San Franciso, 1911; died August 16; aged 68.

Hufnagel, Oscar S., Clayton, Ill.; School of Dentistry, Indiana University, 1928; died July 19; aged 48.

Hughes, Reuben M., Dodgeville, Wis.; Dental School, Marquette University, 1924; died August 31; aged 55.

Jaeger, Leon G., Hillsboro, Kan.; Kansas City-Western Dental College, 1923; died April 16; aged 56.

Johnson, Kenneth E., Helena, Mont.; College of Dentistry, University of Southern California, 1947; died August 23; aged 32.

Johnson, Ralph W., Clinton, S. C.; School of Dentistry, Emory University, 1910; died August 1; aged 62.

Kincaid, Joseph L., Greenville, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1912; died July 22; aged 64.

Klein, William H., Connellsville, Pa.; School of Dentistry, Indiana University, 1931; died August 24; aged 45.

Kline, Loran L., Ontario, Ore.; College of Dentistry, University of Iowa, 1917; died July 5.

Kraus, Charles A., Topeka, Kan.; Western Dental College, Kansas City, 1904; died June 29; aged 79.

Kuki, Matsusabro, Chicago; School of Dentistry, North Pacific College of Oregon, Portland, 1919; died May 12; aged 65.

Kyle, Thomas J., Andover, Mass.; Dental School, Harvard University, 1917; died in August; aged 57.

Larson, Elmer V., Atwater, Minn.; Dental School, Northwestern University, 1915; died July 27; aged 63.

Latimer, Ira D., Portland, Ore.; School of Dentistry, North Pacific College of Oregon, Portland, 1913; died July 7; aged 70.

LeClair, Charles A., Providence, R. I.; Dental School, Tufts College, 1909; died August 3; aged 72.

Lee, Robert E., Edna, Texas; Texas Dental College, Houston, 1910; died July 12; aged 62.

Leseman, George G., Waco, Texas; School of Dentistry, Washington University, St. Louis, 1934; died July 18; aged 42.

Lewis, Stanley G., Azusa, Calif.; College of Dentistry, University of Southern California, 1928; died June 23; aged 49.

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Fourth Annual Session	Sept. 28-Oct. 1, 1953	Cleveland
Ninety-Fifth Annual Session	Nov. 8-11, 1954	Miami
Ninety-Sixth Annual Session	Oct. 17-20, 1955	San Francisco

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 9-11, 1953	Montgomery	F. A. Finney, Jr.	1045 Forrest Ave., Gadsden
Alaska	July 22-25, 1953	Juneau	J. D. Smith	Box 134, Juneau
Arizona	Apr. 23-25, 1953	Tucson	E. M. Scott	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 5-8, 1953	Little Rock	D. M. Hamm	White Bldg., Clarksville
California	Apr. 13-15, 1953	San Francisco	L. R. Ludwigsen	450 Sutter St., San Francisco
S. California	Apr. 20-22, 1953	Los Angeles	C. A. Moss	903 Crenshaw Blvd., Los Angeles
Colorado	Oct. 4-7, 1953	Colorado Springs	W. R. Humphrey	724 Republic Bldg., Denver
Connecticut	May 20-23, 1953	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware	Jan. 14, 1953	Wilmington	J. J. Ficca	2130 Lancaster Ave., Wilmington
District of Columbia	Mar. 15-18, 1953	Washington	K. H. Wood	202-1835 Eye St., N. W., Washington
Florida	Apr. 19-22, 1953	St. Petersburg	C. T. Brown	602 Citizens Bldg., Tampa 2
Georgia			J. M. Heard, Jr.	803 Persons Bldg., Macon
Hawaii		Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu 17
Idaho	June 18, 1953	Sun Valley	J. F. Julian	206 Rogers Bldg., Idaho Falls
Illinois	May 11-14, 1953	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana	May 18-20, 1953	Indianapolis	E. E. Ewbank	Kingman
Iowa	May 4-6, 1953	Des Moines	H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas	May 10-13, 1953	Kansas City, Mo.	F. A. Richmond	861 Brotherhood Bldg., Kansas City
Kentucky	Apr. 7-9, 1953	Louisville	A. B. Coxwell	1976 Douglass Blvd., Louisville
Louisiana	Apr. 29-May 2, 1953	New Orleans	J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 25-27, 1953	Rockland	S. M. Gower	Box 27, Skowhegan
Maryland			E. L. Pessagno, Jr.	415 Medical Arts Bldg., Baltimore 1
Massachusetts	May 3-6, 1953	Boston	H. E. Tingley	12 Bay State Road, Boston
Michigan	Apr. 20-23, 1953	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Feb. 23-25, 1953	Minneapolis	C. V. E. Cassel	242 Lowry Medical Arts Bldg., St. Paul
Mississippi		Jackson	H. M. Campbell	102 Professional Bldg., Tupelo
Missouri	May 10-13, 1953	Kansas City	R. R. Rhoades	201 Merchants Bank Bldg., Jefferson City
Montana	May 7-9, 1953	Missoula	C. S. Renouard	304 Phoenix Bldg., Butte
Nebraska	May 11-13, 1953	Lincoln	F. A. Pierson	1112 Federal Securities Bldg., Lincoln
Nevada	May 4, 5, 1953	Las Vegas	J. E. Ahlstrom	1150 Arizona, Boulder City
New Hampshire	June 11-14, 1953	Bretton Woods	F. E. Williams	814 Elm St., Manchester
New Jersey	April 22-24, 1953	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 24-27, 1953	Albuquerque	J. S. Eilar	Suite 7, Medical Arts Square, Albuquerque
New York	May 12-15, 1953	New York	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	May 17-20, 1953	Pinehurst	B. N. Walker	608 Liberty Life Bldg., Charlotte
North Dakota	May 24-27, 1953	Fargo	J. H. Lunday	302 Black Bldg., Fargo
Ohio	Nov. 8-11	Columbus	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 19-22, 1953	Tulsa	D. Robertson	434 N. W. 13th St., Oklahoma City
Oregon	Mar. 2-4, 1953	Portland	H. C. Fixott, Jr.	Medical Dental Bldg., Portland
Panama Canal Zone	Dec. 9		F. D. Buckley	Box 293, Rodman
Pennsylvania	May 20-22, 1953	Atlantic City, N.J.	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico	Jan. 23-25, 1953	San Juan	A. Quiñones	San German
Rhode Island	Jan. 18-21, 1953	Providence	E. L. Bessette	1745 Broad St., Cranston 5
South Carolina	June, 1953	Greenville	J. R. Owings	7 Medical Court, Greenville
South Dakota	May, 1953	Rapid City	E. W. Elmen	Sioux Falls
Tennessee	May 11-14, 1953	Knoxville	W. L. McCulley	Brown Bldg., Cleveland

State	Date	Place	Secretary	Address
Texas	May 10-14, 1953	Houston	W. Ogle	3607 Gaston Ave., Dallas
Utah	Apr. 27-29, 1953	Salt Lake City	K. L. Dedekind	914 Medical Arts Bldg., Salt Lake City
Vermont	May 17-19, 1953	Woodstock	W. J. Reardon	Rutland
Virginia	May 4-6, 1953	Roanoke	J. E. John	804 Medical Arts Bldg., Roanoke
Washington	June 18-20, 1953	Yakima	F. J. Dingler	1502 Medical-Dental Bldg., Seattle
West Virginia	July 13-15, 1953	White Sulphur Springs	A. B. Drake	506 West Virginia Bldg., Huntington 1
Wisconsin	Apr. 6-9, 1953	Milwaukee	R. A. Mason	964 N. 27th St., Milwaukee
Wyoming		Casper	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

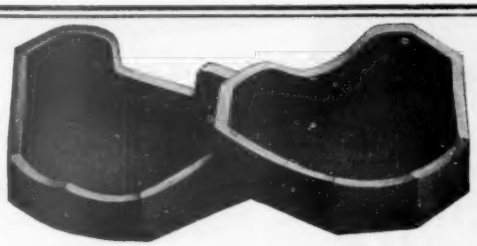
State	Date	Place	Secretary	Address
Alabama	June 14, 1953*	Birmingham	M. D. Edwards	132 Adams Ave., Montgomery
Alaska	July 6-11, 1953	Fairbanks	J. H. Geyer	209 Goldstein Bldg., Juneau
Arizona			R. K. Trueblood	25 N. Second Ave., Glendale
Arkansas	June 22-26, 1953	Little Rock	H. O. Weatherly	205 Halter Bldg., Conway
California			K. I. Nesbitt	507 Polk St., San Francisco 2
Colorado	June 22-26, 1953	Denver	C. K. Phillips	724 Republic Bldg., Denver 2
Connecticut	Nov. 10-15*	Bridgeport	C. G. Brooks	302 State St., New London
Delaware			P. K. Musselman	143 W. Main St., Newark
District of Columbia	Jan. 5-9, 1953	Washington	W. T. Birthright	1835 Eye St., N. W., Washington 6
Florida			A. W. Kellner	P. O. Box 155, Hollywood
Georgia			S. H. Yarbrough	Medical Arts Bldg., Columbus
Hawaii			H. L. Houvener	427 Dillingham Bldg., Honolulu
Idaho			W. K. Adams	1624 Arlington, Caldwell
Illinois			W. A. McKee	503 Wood Bldg., Benton
Indiana	Nov. 17-20*	Indianapolis	C. A. Frech	504 Broadway, Gary
Iowa	May 25-29, 1953*	Iowa City	H. M. Willits	719 Roshek Bldg., Dubuque
Kansas			G. L. Teall	Box 71, Hiawatha
Kentucky			R. I. Todd	Western Union Bldg., Richmond
Louisiana			A. R. de Nux	Marksville
Maine			R. A. Derbyshire	Box 387, Skowhegan
Maryland	Nov. 3-5	Baltimore	H. Levin	3429 Park Heights Ave., Baltimore 15
Massachusetts			R. A. Barrette	Rm. 33 State House, Boston
Michigan	Jan. 26-30, 1953	Ann Arbor	J. L. Champagne	3714 W. McNichols Road, Detroit 21
	June 8-12, 1953			
Minnesota			F. A. Larson	1632 Washington St., N. E., Minneapolis
Mississippi	Jan. 5-7, 1953	Jackson	J. C. Boswell	508 Lamar Life Bldg., Jackson
	June 16-18, 1953			
Missouri			R. R. Rhoades	414 Central Trust Bldg., Jefferson City
Montana			V. J. Quinn	Box 865, Helena
Nebraska			H. E. Weber	1210 Federal Securities Bldg., Lincoln
Nevada			G. C. Steinmiller	Suite 6, Masonic Temple, P. O. Box 2473, Reno
New Hampshire			D. J. Freese	4 Wall St., Concord
New Jersey	Dec. 1, 2**‡‡	Philadelphia	W. A. Wilson	150 E. State St., Trenton 8
	Dec. 3-5§	Trenton		
New Mexico	May 24-27, 1953	Albuquerque	J. J. Clarke, Sr.	Artesia
New York			D. W. Beier	23 S. Pearl St., Albany 7
North Carolina			F. O. Alford	1109 Liberty Life Bldg., Charlotte 2
North Dakota	July 13-17, 1953	Fargo	A. B. Crabtree	Ellendale
Ohio			H. B. Smith	322 E. State St., Columbus
Oklahoma			J. B. Cole	706 Asp St., Norman
Oregon	Dec. 8-11*	Portland	F. L. Utter	506 Pioneer Trust Bldg., Salem
Pennsylvania	Dec. 1-3‡	Philadelphia	A. M. Stinson	Dept. of Public Instruction
	Dec. 3-5**			Box 911, Harrisburg
	Dec. 4††			
Puerto Rico			L. C. Coll	Box 9156, Santurce
Rhode Island	Nov. 25, 26	Providence	F. M. Hackett	267 Academy Ave., Providence
South Carolina			T. C. Sparks	1315 Pickens St., Columbia
South Dakota			O. Isaak	Tyndall
Tennessee	Dec. 10-15	Memphis	F. S. Maxey	804 Bennie Dillon Bldg., Nashville 3
Texas			R. T. Weber	312 Capital National Bank Bldg., Austin
Utah			M. W. Merrill	820 N. University Ave., Provo

State	Date	Place	Secretary	Address
Vermont			F. A. Reid	Windsor
Virginia	June 8, 9, 1953‡‡ June 8-12, 1953†	Richmond	J. M. Hughes	715 Medical Arts Bldg., Richmond 19
Washington	Jan. 12, 1953	Seattle	J. B. Keifer, Jr.	510 Cobb Bldg., Seattle
West Virginia	June 22-24, 1953*	West Liberty	C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin	Jan. 12-16, 1953*	Milwaukee	S. F. Donovan	Tomah
Wyoming			W. A. Hocker	212 O & S Bldg., Casper

*Dentistry and dental hygiene.
**Dental clinical examinations.
†Dental examinations.
††Hygiene clinical examinations.
‡Dental written examinations.
‡‡Hygienists' examinations.
*Dental and dental hygiene written examinations.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
Academy of Denture Prosthetics	Apr. 12-19, 1953	Los Angeles	L. L. Furnas Secy.	928 Silverado St., La Jolla, Calif.
American Academy of Dental Medicine	Dec. 7	New York	W. M. Greenhut Secy.	124 E. 84th St., New York 28
American Academy of Restorative Dentistry	Feb. 7, 8, 1953	Chicago	A. G. James Secy.	409 N. Camden Drive, Beverly Hills, Calif.
American Association of Dental Schools	Mar. 23-25, 1953	Philadelphia	M. W. McCrea Secy.	Baltimore College of Dental Surgery, Dental School, University of Maryland, Baltimore 1
American Board of Orthodontics	Apr. 22-26, 1953	Dallas, Texas	C. E. Martinek Secy.	661 Fisher Bldg., Detroit 2
American Board of Prosthodontics	Feb. 1-7, 1953	Indianapolis	I. R. Hardy Secy.	Tufts College Dental School, 136 Harrison Ave., Boston 11
American Denture Society	Feb. 7, 8, 1953	Chicago	A. L. Roberts Secy.	Aurora National Bank Bldg., Aurora, Ill.
Chicago Dental Society	Feb. 8-11, 1953	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago 2
Council on Dental Education, Dental Aptitude Tests	Mar. 6, 7, 1953		S. Peterson Secy.	222 E. Superior St., Chicago 11
Dallas Mid-Winter Dental Clinic	Jan. 25-28, 1953	Dallas, Texas	W. C. McCaskill, Jr. Gen. Chm.	1329 Medical Arts Bldg., Dallas, Texas.
Denver Dental Association	Jan. 11-14, 1953	Denver	H. L. Harris Secy.	724 Republic Bldg., Denver 2
Great Lakes Society of Orthodontists	Nov. 10-12	Toronto, Canada	C. R. Anderson Secy.	402 Loraine Bldg., Grand Rapids, Mich.
Greater New York Dental Meeting	Dec. 8-12	New York	A. E. Corby Chm.	Hotel Statler, Room 106A, New York
Greater Philadelphia	Feb. 4-6, 1953	Philadelphia	R. Adams Secy.	Bellevue-Stratford Hotel, Suite 337, Broad and Walnut Sts., Philadelphia 2
International Association for Dental Research	Mar. 20-22, 1953	Philadelphia	E. H. Hatton Secy.	311 E. Chicago Ave., Chicago 11
National Board of Dental Examiners	Dec. 1, 2		S. Peterson Secy.	222 E. Superior St., Chicago 11
New Orleans Dental Conference	Nov. 9-12	New Orleans	M. R. Matta Secy.	629 Maison Blanche Bldg., New Orleans
Northeastern Society of Orthodontists	Nov. 10-11	Montreal, Canada	O. Jacobson Secy.	35 W. 81st St., New York
Odontological Society of Western Pennsylvania	Nov. 11-13	Pittsburgh	W. E. Craig Secy.	206 Jenkins Bldg., Pittsburgh 22
Pan American Odontological Association	Dec. 10	New York	R. H. Brodsky Acting Exec. Secy.	14 E. 81st St., New York
Southeastern Society of Oral Surgeons	Mar. 6, 7, 1953	Birmingham, Ala.	C. F. Landeis Secy.	316 James Bldg., Chattanooga, Tenn.
Southern Academy of Oral Surgery	Mar. 21, 22, 1953	Atlanta, Ga.	R. F. Sullivan Secy.	118 E. Jones St., Savannah, Ga.



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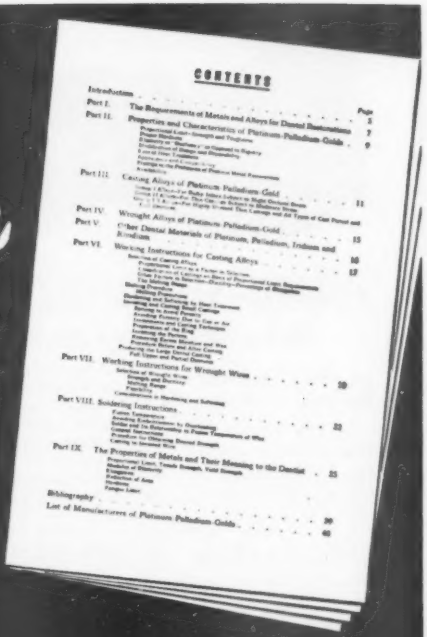
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"Platinum–Palladium–Gold in Dentistry," was compiled in order to classify and simplify the extensive information on precious metals as an aid to dentists and technicians.

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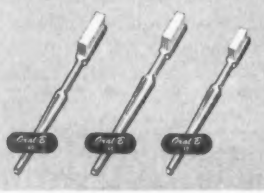

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ILLINOIS—Profitable practice, laboratory, operating room and reception room in town of 3,500 and County. Dentist leaving for service, seven year practice. Splendid opportunity for a good dentist. Direct replies to Dr. Anthony J. Cannova, Oregon, Ill.

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ILLINOIS—For sale: active dental practice west central Illinois community of 45,000. Three state drawing area; two chair office, x-ray, one unit left-handed. Dentist recalled to service. Address A.D.A. Box No. 133.

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ILLINOIS—Chicago—For sale: completely equipped dental office. S. S. White cream white equipment, 5 years old. Located heart of South Shore. Complete patient file. Owner leaving city. Address A.D.A. Box No. 134.

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MICHIGAN—For sale: dental office Charlotte, Mich. Population 7,000. Community in need of another dentist. Owner now in the Navy. Price very reasonable. Direct replies to Dr. William Clark, 112 Delaware, Forrestal Village, North Chicago, Ill.

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MICHIGAN—For sale: well established practice in upper peninsula town of 10,000. Prosperous mining community and winter sports area. Priced reasonably. Owner leaving state. Direct replies to Dr. J. A. Plirto, Ishpeming, Mich.

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MINNESOTA—Practice and office for sale; city of 30,000. Excellently established practice; with or without equipment. Direct replies to Dr. Philip S. Loechler, P. O. Box 415, Rochester, Minn.

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OPPORTUNITIES WANTED

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WANTED—Dentist, 1949 Northwestern graduate returning from 24 months military duty desires practice, association or position. Indiana license, 18 months' teaching experience. Available January 1, 1953. Address A.D.A. Box No. 148.

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•

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WANTED—Dentist, 1947 graduate, desires to purchase busy general practice or form association in Baltimore or vicinity. Soon completing 24 months duty in Air Force. Age 29. Address A.D.A. Box No. 152.

WANTED—Dentist, Missouri license, recently separated from service, desires opportunity to practice general dentistry. Will go anywhere. Address A.D.A. Box No. 153.

•

WANTED—Dentist, New Jersey practice wanted, must be active, grossing minimum of $25,000. Am capable all around operator, excellent exodontist and prosthodontist. Will consider partnership. Address A.D.A. Box No. 116.

•

WANTED—Dentist, graduate of state university, Navy internship and service, eight years experience in public health and general practice dentistry. Age 32. Wife is trained dental technician. Desire territorial or foreign position. Free to travel. Address A.D.A. Box No. 129.

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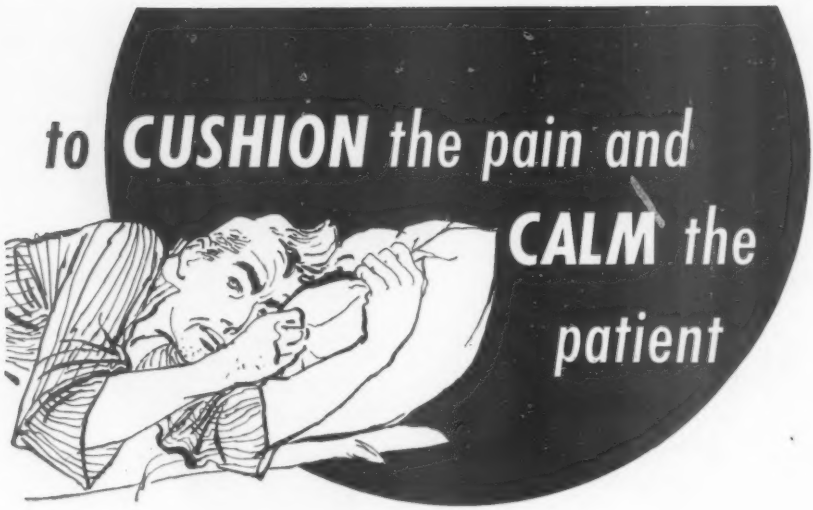

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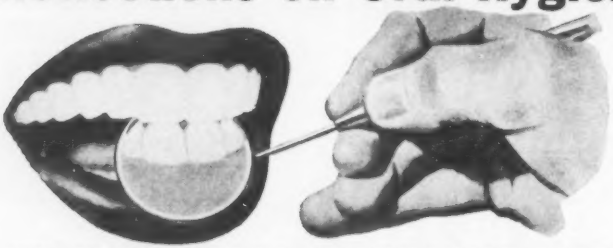

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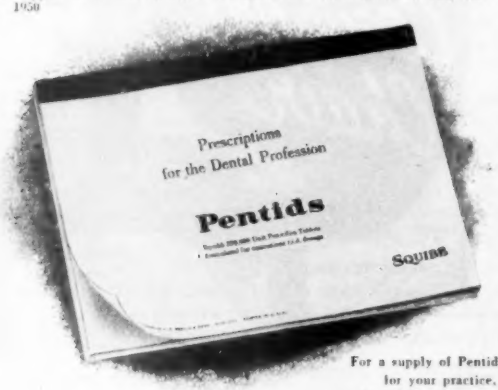
1. Keefer, C. S., Postgrad. Med. 9:101, Feb. 1951
2. Flippin, H. F., and Israel, H. L., Med. Clin. North Amer. 34:1653, Nov. 1950



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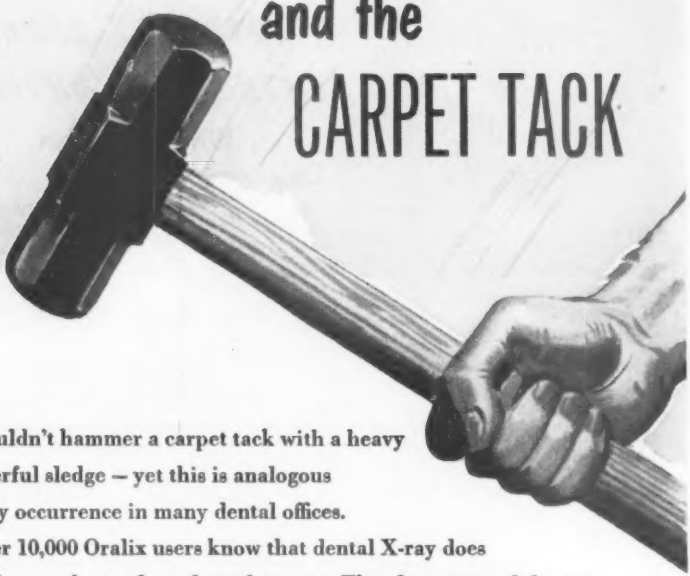

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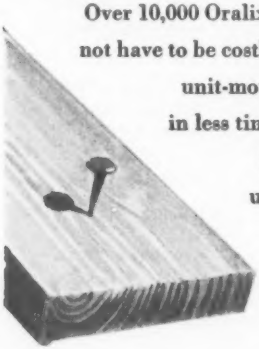

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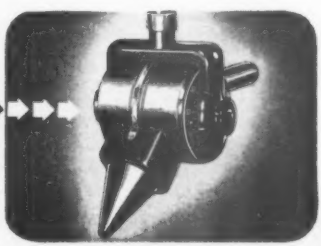

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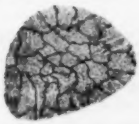
F FOR FINE-GRAIN STRUCTURE . . . 

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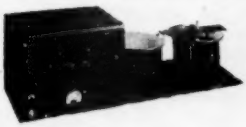
T TI-LECTRO POLISHED . . . 

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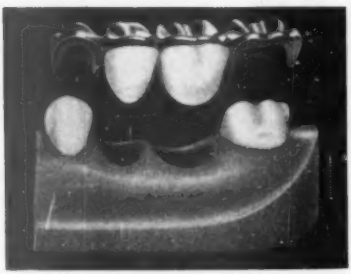

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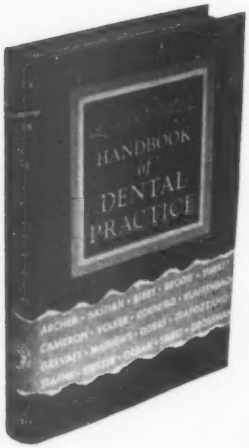

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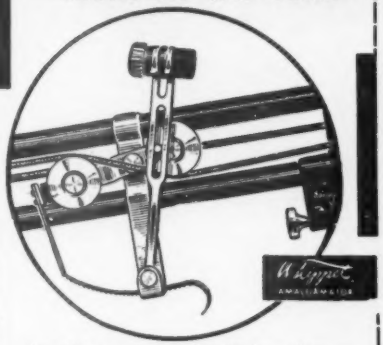

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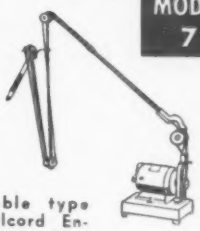

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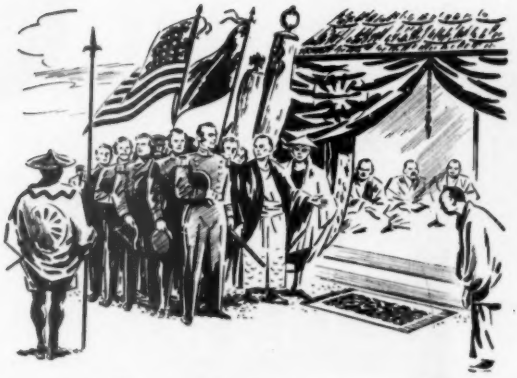

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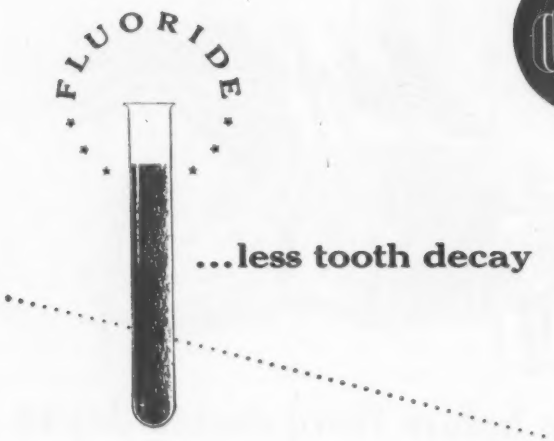

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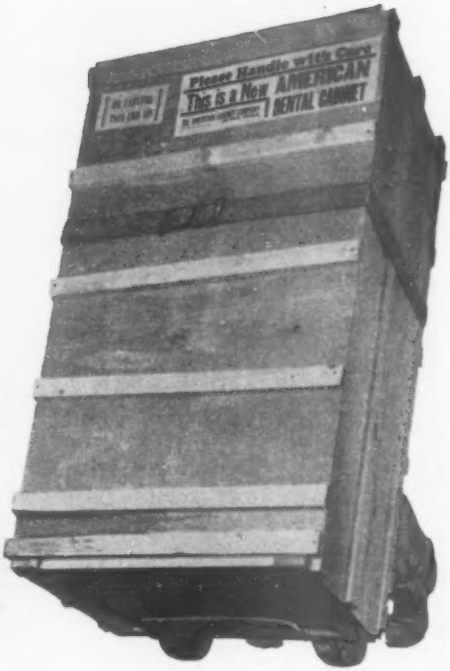

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Nov. 1952

In Canada, dentists not only come "fewer and further between", as compared with the U.S., but seem to be getting more so. While the U.S. boasts one dentist for each 1900 persons, up in the dominion it was one for each 2665 persons in 1938—decreasing by 1951 to only one for each 2750 persons!

• • •

Everybody likes children—even dentists, although maybe not quite as much as they used to. According to a recent Fauchard poll, the 19% of the average dental practitioner's time devoted to pedodontia in 1949, is down this year to 18%. And whereas 68% felt well paid for this work three years ago, today only 57% do. Furthermore in '49, 81% found it as pleasant as the dental care of adults; today only a hardy 65% do!

• • •

Dental students of histology are not advised to follow the procedure of Leeunwenhock—famous Dutch microscopist (died 1723)—who, to describe the anatomical structure of teeth, extracted one of his own for examination. He was the first to see bacteria (leptothrix) in the tartar collected from a tooth surface.

• • •

The book "Artificial Teeth Made from Calves' Bones", by J. Channing, an Englishman, is said to be the first book published to be wholly concerned with prosthetic dentistry. It was printed in 1778.

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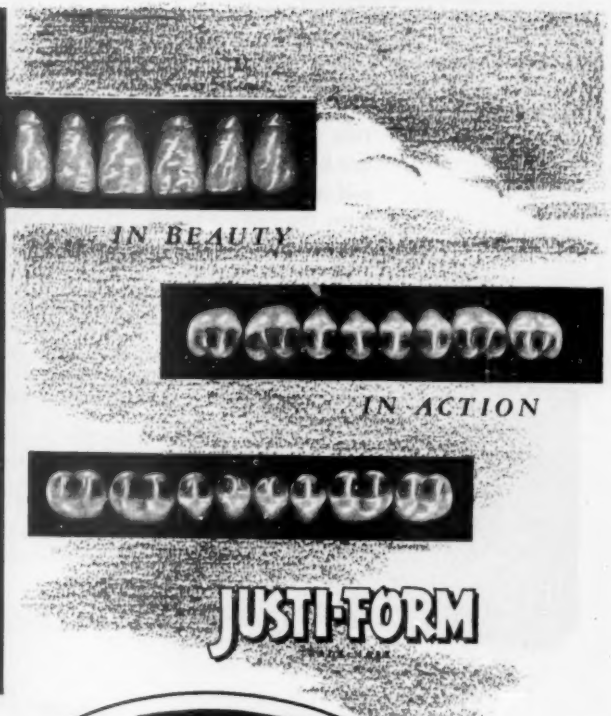

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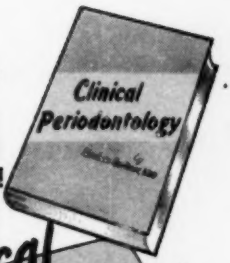

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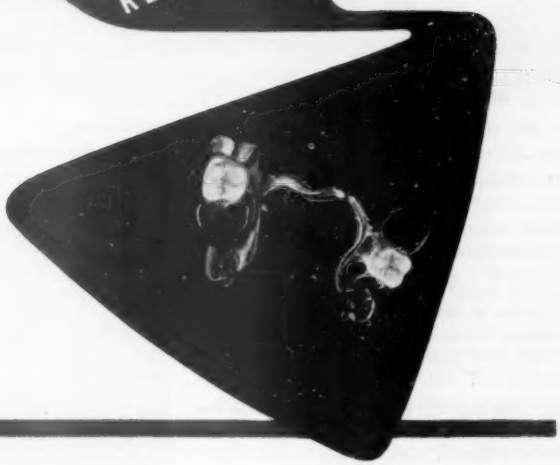

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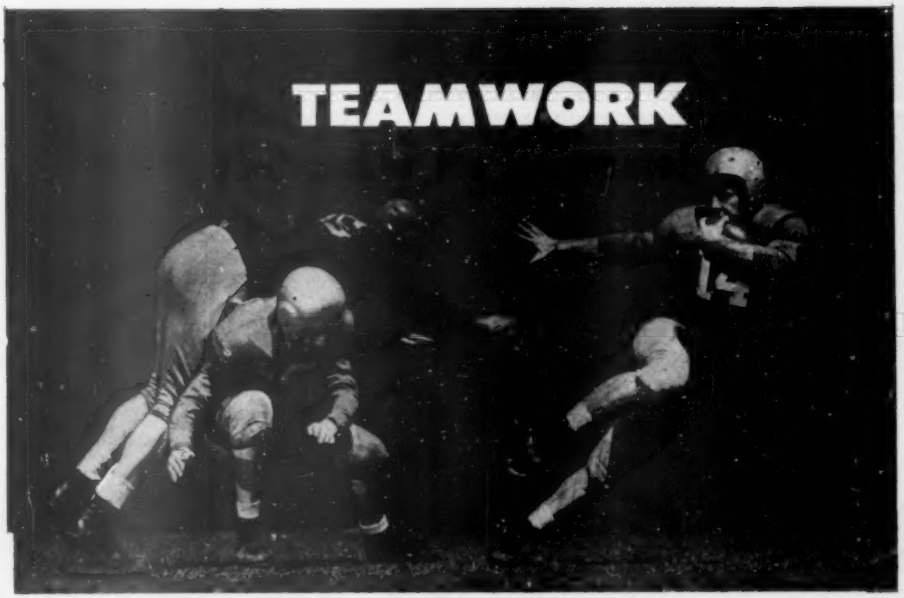

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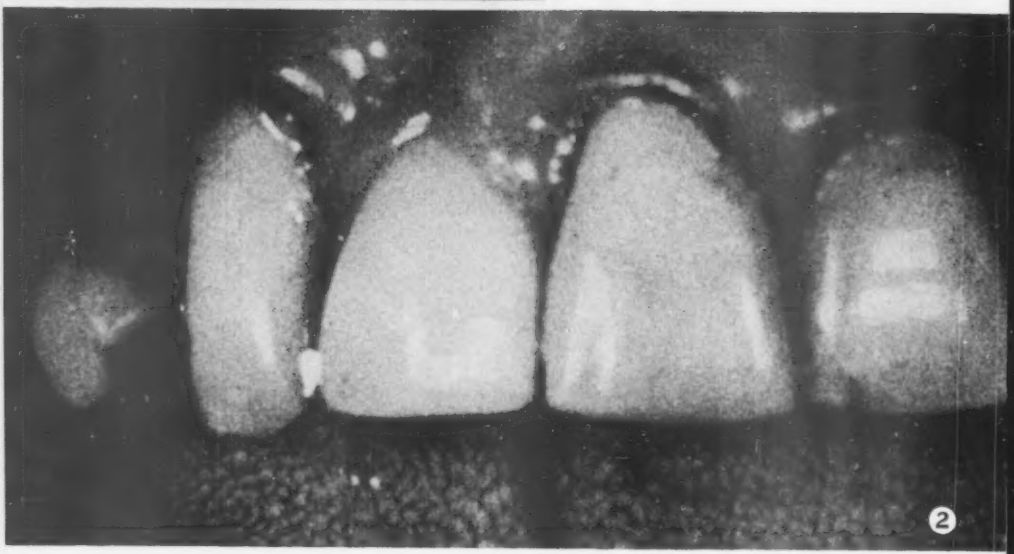

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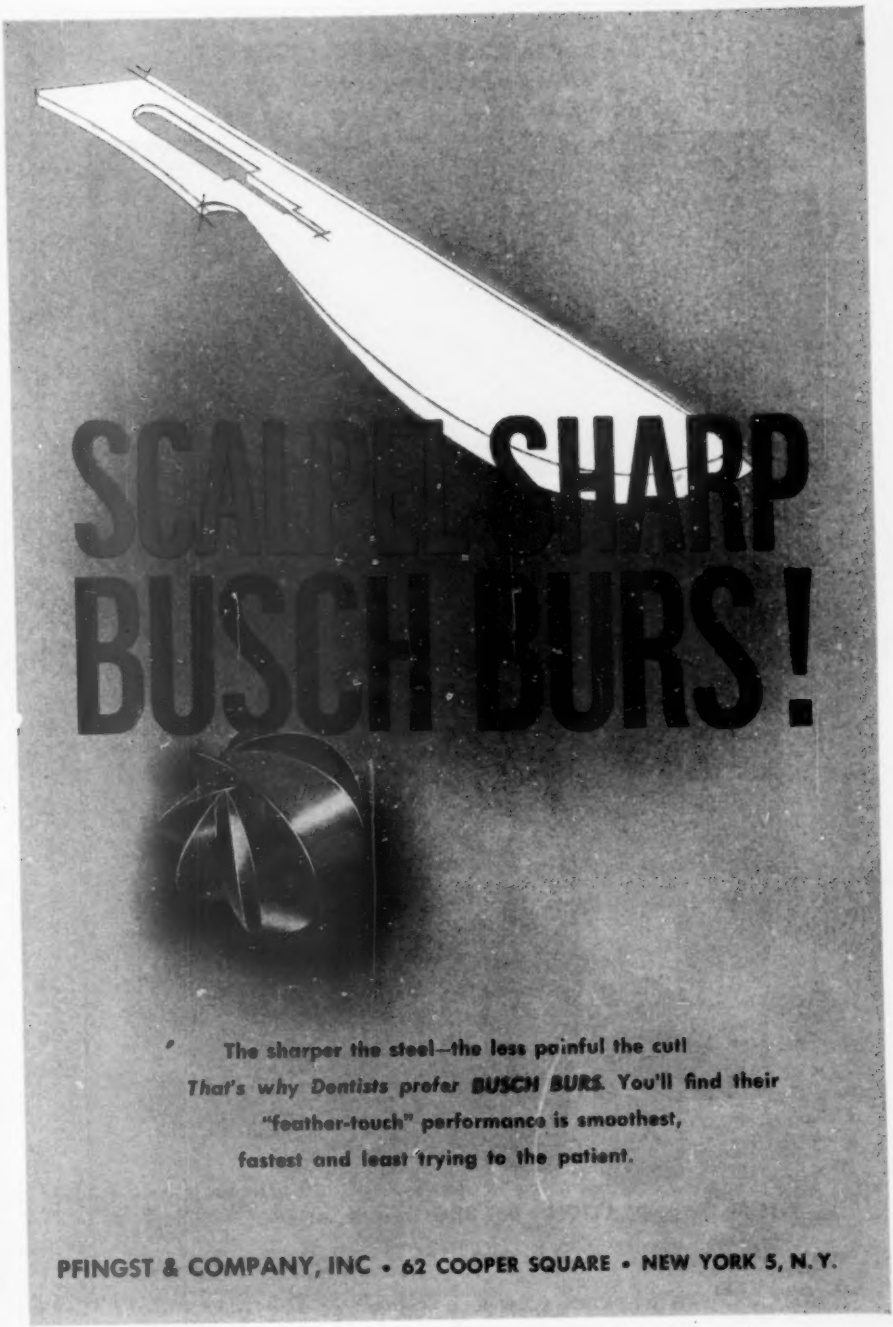
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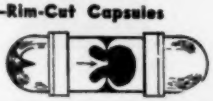

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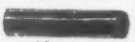

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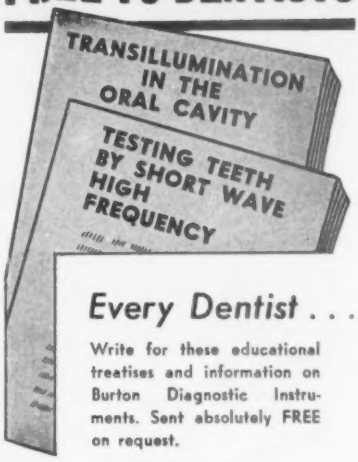

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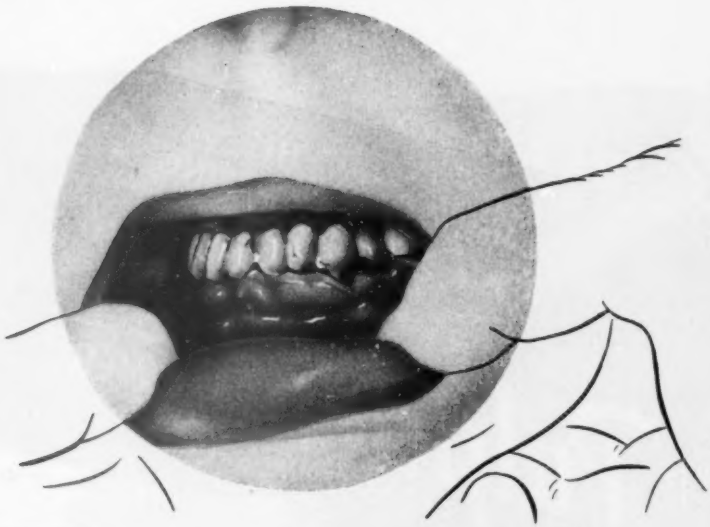

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(1) Berk, H., J. Dent. for Child., 17:65 (4th quarter) 1950.

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VENEERS
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